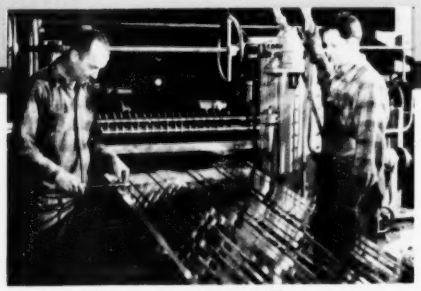
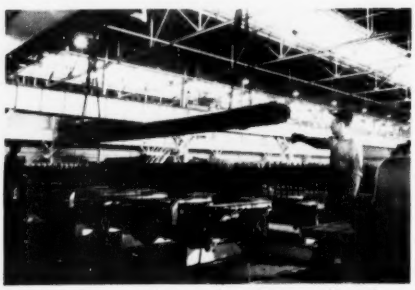
JULY 13, 1953

STEEL

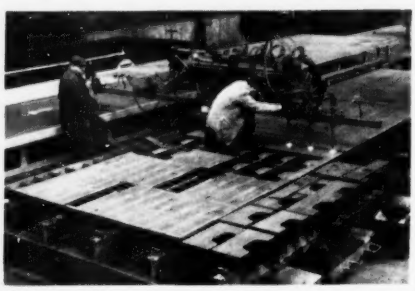
THE WEEKLY MAGAZINE OF METALWORKING



Slitting coils to narrow widths



Angles prepared for shearing to length



Flame-cutting plates to contour

Conveyor speeds order processing

Warehouses Offer Plus Service . . .

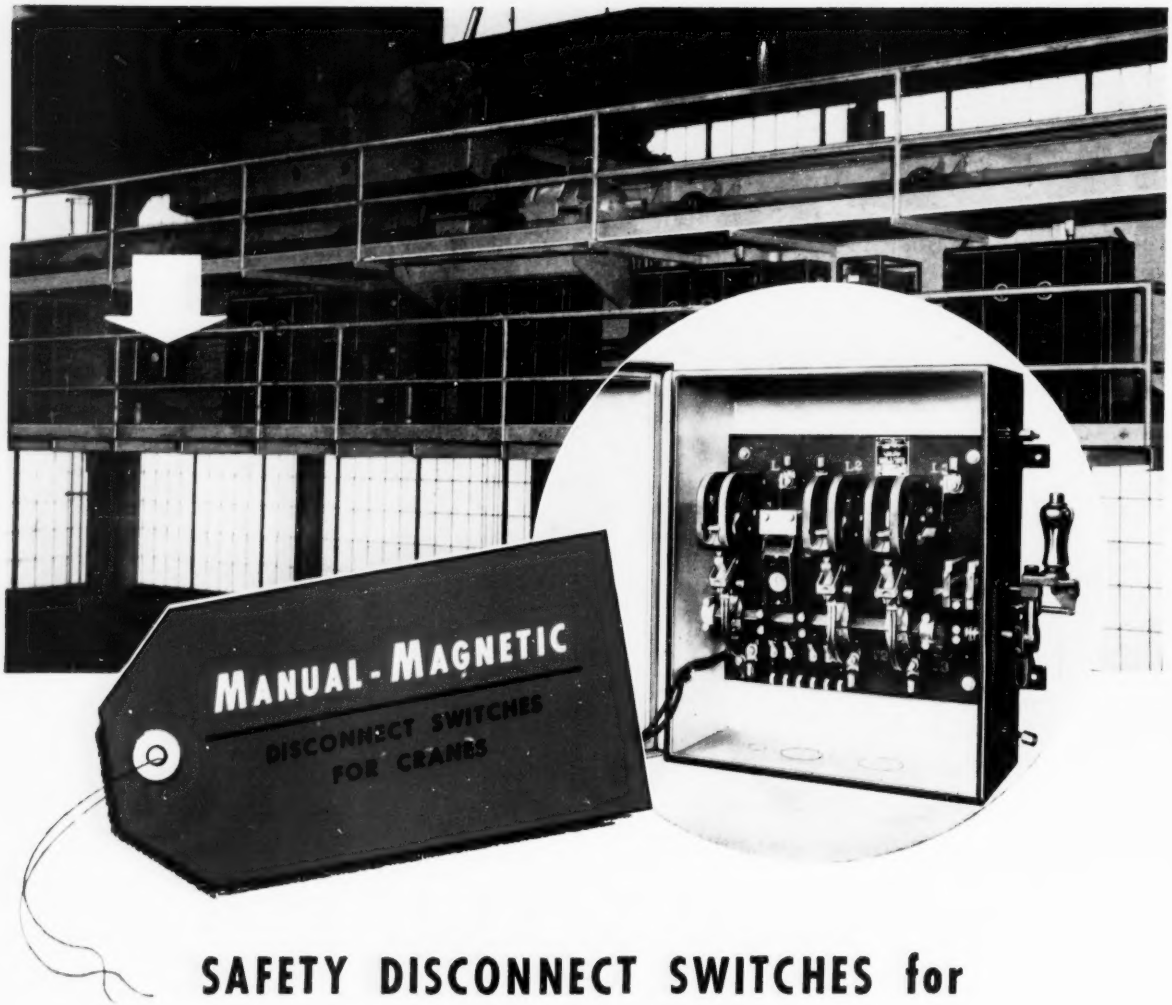
Quick delivery heartbeat of function but distributors meet challenge of times by offering more cutting, slitting and shearing—p. 67

✓ **PLANE OUTPUT SOARS IN 1953**
Some 16,000 Will Be Built, p. 57

✓ **AUTOMATIC FOUNDRY NO DREAM**
Shell Molding Is Key Point, p. 98

✓ **CORROSION IN POWDER METAL PARTS**
Resin Impregnation Checks It, p. 122

CONTENTS — PAGE 5



SAFETY DISCONNECT SWITCHES for A-c and D-c Cranes

SAFETY FOR EQUIPMENT — These switches meet crane specifications for disconnect means on footwalk and in crane cab. Only one unit to install — push button permits disconnecting the crane from the cab in an emergency.

High interrupting capacity — built to withstand crane service — no delicate parts to loosen under vibration.

EASIER FOR OPERATORS — Positive closure to "full-on" position magnetically—so easy a child can operate it. Pulling handle down opens holding circuit; manual follow-up by roller on handle-shaft forces contacts open if contactors fail to drop-out. Proof against accidental closure, too.

Auxiliary contacts for signal lights—provision for padlock — front-connected leads — large wiring space. This switch simplifies the spare-part problem since parts are of crane control design. Tops in *safety* and *convenience*.

WRITE FOR BULLETIN 1024 ON MANUAL-MAGNETIC DISCONNECTS

1024

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Are You Using Special Alloy Steels for Standard Alloy Jobs?

An estimated 95 of every 100 civilian and military jobs that require alloy steel can be handled effectively with AISI standard alloy grades. Generally speaking, the exceptions that call for special alloy grades are those jobs involving resistance to heat, corrosion, or low-temperature impact.

You Benefit by Using Standard AISI Grades

The vast majority of engineering applications for alloy steel simply involve heat treating to required levels of strength or hardness. For these applications standard alloy steels will quench out to practically any combination of properties. And the over-alloying of a small section will add nothing to its properties, and will make it more susceptible to quenching cracks.

The chemical ranges of standard grades usually fall within closer limits than those of special steels. Standard methods of heat-treatment can be employed and the resulting property ranges can be predicted to a closer degree.

You can ordinarily get better deliveries of standard grades. This means that you can operate with smaller inventories and with less capital tied up in slower-moving special grades.

At Bethlehem we manufacture special-analysis alloy steels as well as the entire range of AISI standard alloy grades and standard carbon steels. We are obviously in a position to make unbiased recommendations. Our metallurgists are experienced in solving problems that pertain to all types of steel. Call on us for advice at any time.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

PHOENIX IRON & STEEL COMPANY, Phoenixville, Pa., is one of the nation's oldest steel producers. Above, Phoenix open hearth furnace being tapped by bazooka gun.

Steel, anyone?

Or, for that matter, aluminum, Fiberglas, magnesium?

Name a basic material on industry's shopping list and chances are that one of Barium's 16 integrated companies has a hand in its production or fabrication.

No other steel producer fabricates so many different products. No other processor can match Barium's ability to turn magnesium, the versatile sea-born metal, into basic structural forms. Barium specialists are also breaking new ground in the utilization of Fiberglas for structural applications, such as aircraft shelters and barges.

This close-knit and fully integrated organization of 16 companies offers you a wealth of top-rank engineering talent and extremely flexible production facilities. They can take excellent care of your requirements for structural and fabricated materials, whether routine or highly specialized. We'll be glad to tell you how. Just drop a line on your company letterhead direct to Barium Steel Corporation, 25 Broad Street, New York 4, N.Y.

BAYONNE BOLT CORP. • CENTRAL IRON AND STEEL COMPANY • CHESTER BLAST FURNACE • CLYDE IRON WORKS, INC. • CUYAHOGA SPRING COMPANY • EAST COAST AERONAUTICS, INC. • ERIE BOLT AND NUT COMPANY • GEOMETRIC STAMPING CO. • GLOBE FORGE INCORPORATED • INDUSTRIAL FORGE & STEEL, INC. • JACOBS AIRCRAFT ENGINE CO. • KERMATH MANUFACTURING CO. • KERMATH LIMITED (CANADA) • PHOENIX BRIDGE CO. • PHOENIX IRON & STEEL CO. WILEY MANUFACTURING CO.

3.6

INDUSTRIAL FORGE & STEEL, INC., Canton, O., one of the nation's largest producers of heavy flat-die forgings, works in all types of steels and other metals. Here, titanium is being forged.

AT 60° BELOW, this air-borne Fiberglas-and-magnesium alert shelter protects planes and crews. Designed and built by Barium's East Coast Aeronautics, Inc., Pelham Manor, N. Y.

DOUBLE CHECK is given a radiator support for an Army truck by inspectors at Geometric Stamping Co., Cleveland, O., which turns out steel and aluminum stampings for industry.

Macwhyte 8-Part Atlas Type 1 Round-Braided Wire Rope Sling

GREATER SLING FLEXIBILITY THROUGH

BALANCED BRAIDING

Macwhyte's Atlas Braided Slings

Atlas Braided Slings have far greater flexibility because of Macwhyte's *balanced* method of construction:

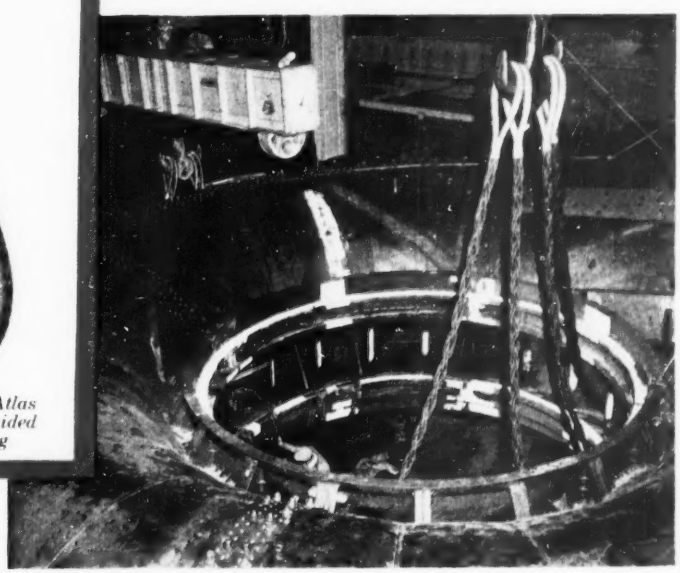
1) Ropes are spliced endless before braiding.
2) Right lay ropes balance left lay ropes.
3) All ropes follow uniform spiral paths, assuring balanced tension throughout the sling body.

Macwhyte's "Balanced Braid" permits fuller, safer gripping . . . no kinking . . . no spinning . . . faster materials handling.

Complete line of slings for every need

Three body types are available: Atlas Round-Braided, Drew Flat-Braided, Monarch Single-Part. All are made to order in any size for any job.

Our sling engineers will be glad to study your sling needs and make recommendations promptly.



115 Ton Casing Assembly Handled with Macwhyte Atlas Type 1, Round-Braided Wire Rope Slings.

Photo courtesy Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

MACWHYTE SLINGS

Ask for New Circular No. 5308

Lists strengths and safe-loads for ATLAS Round-Braided, DREW Flat-Braided, and MONARCH Single-Part Slings.

For cranes and hoists specify PREformed Monarch Whyte Strand Crane Rope made by Macwhyte. Ask for Folder 50-25.

MACWHYTE COMPANY
KENOSHA, WIS.

MACWHYTE COMPANY
2912 Fourteenth Ave., Kenosha, Wisconsin

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cable, Safe-Lock Assemblies, Monel Metal and Stainless Steel Wire Rope.

Mill depots: New York • Pittsburgh • Chicago St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

11 TIMES THE SERVICE

Steel mill was using rag roll as pinch roll on a shear unit. It lasted about three months on the job. Oil, heat, cutting and pressure contributing toward short life.

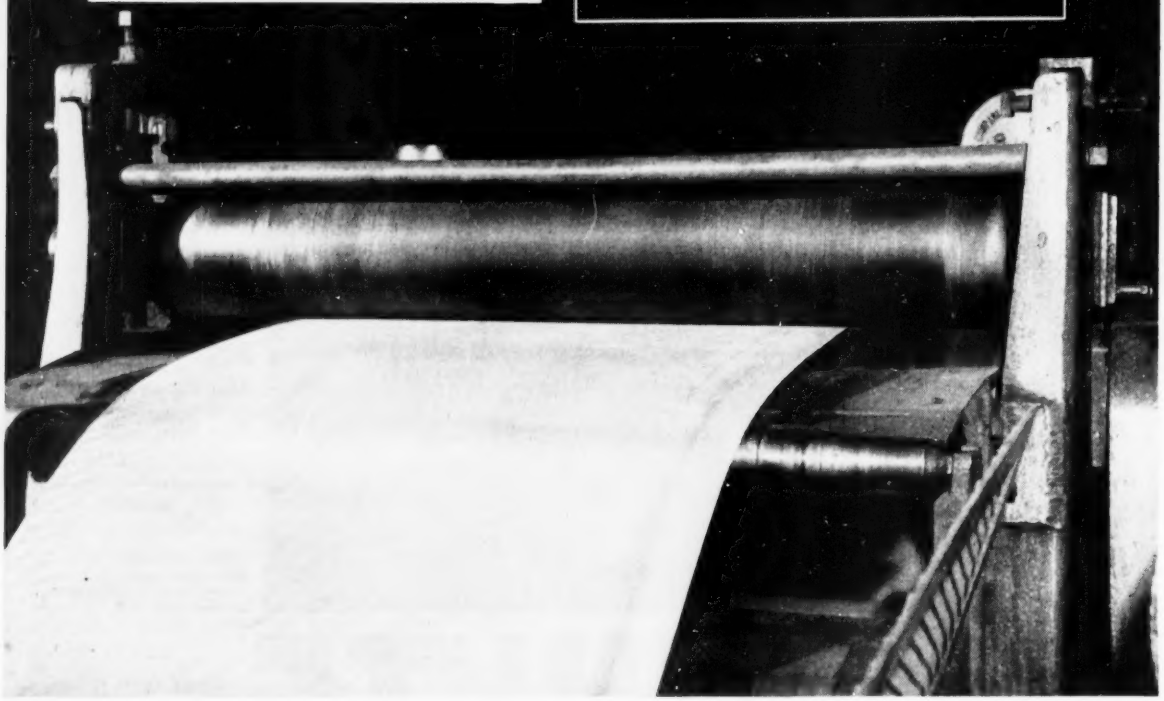
The G.T.M.—Goodyear Technical Man—recommended using a rubber-covered roll, specified compound and thickness to be used in covering the roll. This roll has served 33 months to date—*11 times the service at a slightly lower original cost.*

Why not discuss your roll covering problems—or procurement of complete rolls—with the G.T.M., or write Goodyear, Industrial Products Div., Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified TYPICAL ROLL APPLICATIONS FOR STEEL MILLS

PROCESSES	TYPES OF ROLLS	
Electrolytic Tin Line	Scrubber	Slitter
Carbon Steel Pickling	Wringer	Tension
Continuous Galvanizing Line	Pinch	Directional
Continuous Annealing Line	Hold-down	Carrying
		Coating



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GOODYEAR

THE GREATEST NAME IN RUBBER

This Week in Metalworking

STEEL

Vol. 133 No. 2 July 13, 1953

✓NEWS ✓PRODUCTION-ENGINEERING ✓MARKETS

Metalworking Outlook 49
Selected condensed news items reflecting the possible future course of the metalworking world

As the Editor Views the News 53

Windows of Washington 64

Mirrors of Motordom 71

The Business Trend 75
Facts and figures report and graphically illustrate trends of industrial production

Men of Industry 79

Technical Outlook 97

Automatic Foundry Nears Reality 98
Tieing in shell molding machines with modern handling system is a high-volume combination

Quality Control Takes Teamwork 101
Here are some examples of co-ordinating production, lab and control staffs, and how it pays

Progress in Steelmaking 110
Bigger Copper-Clad Sandwiches—New mill at Superior Steel rolls copper-steel strip three times wider

Improved Corrosion Resistance with Powder Metallurgy Parts 122
Impregnating them with polyester resin prior to plating turns the trick. Cuts other finishing troubles, too

Ion-Free Water Makes Cents in Metal Finishing 124
Takes less cleaning compound, eliminates hard water precipitates. Underfilm corrosion less bothersome

New Products and Equipment 129

The Market Outlook 159
Metal Prices and Composites begin on Page 160

Nonferrous Metals 162

Behind the Scenes 6
Letters to the Editors 10
Checklist on Controls 63
Obituaries 82
Calendar of Meetings 126
Helpful Literature 131

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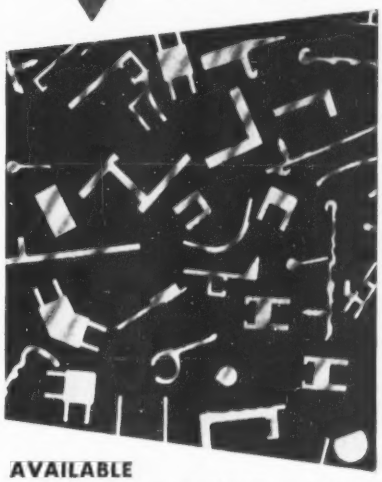
Over 4000 Standard
PE ALUMINUM EXTRUSIONS



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Precision Extrusions catalogs over 4000 standard sizes and shapes of extruded aluminum rods, bars, shapes, and tubing, serving a wide variety of applications in transportation, architecture, and general industry. Or, if your product requirements call for a specially-designed extrusion, PE engineers will work with you in answering your problems of design, alloy-selection, and production.

PE **PERSONALIZED SERVICE** and specialization in aluminum extruding assures you of prompt handling of your inquiry, careful production supervision, and extrusion quality meeting the highest standards of the industry.

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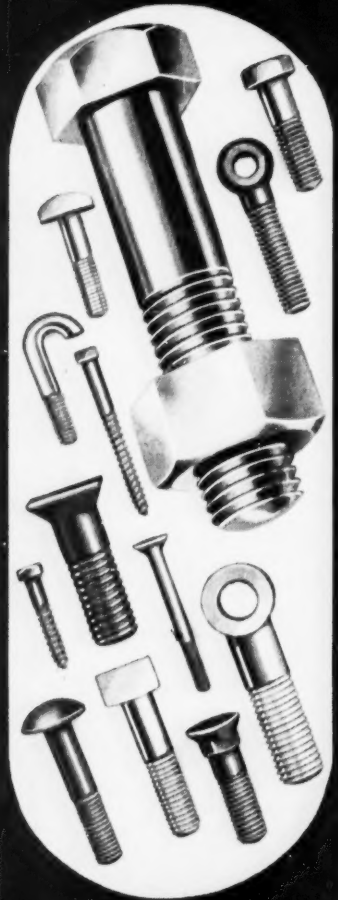
UNIFORM CLASS 3 FIT

BOLTS·NUTS
STUDS

- Carbon Steel
- Alloy Steels
- Stainless Steel
- Silicon Bronze
- Naval Brass
- Monel Metal



You can depend on a uniform Class 3 fit when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.

BETTER BOLTS SINCE 1882

PAWTUCKET

"THE BOLT MAN"
MANUFACTURING COMPANY
327 Pine Street Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS

T.M. REG.

behind the scenes

Penton Pulse Beat

Comments overheard while making a Cook's Tour of the Penton Building one day last week:

In the Pressroom: "I sure miss that old cuspidor since it's gone."

"If you hadn't missed it so often when it was here, it wouldn't be gone."

In the Bindery: "My husband talks in his sleep, does yours?"

"No. He's terribly annoying—he just chuckles."

In the Mail Room: "Nice weather we're having!"

"Yeah, but the boss is having it, too."

In the Production Department: "Do you know that yesterday my neighbor cleaned his shutgun on the front porch and today his daughter got eight proposals?"

In the Lunchroom: "So I said to him, let me tell you one thing before you go any farther. What? he says, sort of surprised like. Don't go any farther, I says."

Outside the Powder Room: "If wives knew what secretaries really thought of their husbands, they wouldn't worry."

In the Editorial Department: "Heard you buried your dog last week?"

"Had too. He was dead, you know."

In the Circulation Department: "I think I'll have another drink, I told this smooth operator last night. It makes you so witty."

In the Census Department: "You're late. You should have been here at eight thirty."

"Why? Did I miss something?"

In the Advertising Department: "Yes, Sir! I'm a self-made man."

"Lucky guy. I'm the revised edition of a wife and three daughters."

In the Marketing Research Department: "Take a look at your taxes and you'll stop calling them cheap politicians."

Life's Little Tragedies

John Morgan, assistant managing editor, was telling us of a unique experience which occurred during his bloodhounding the facts for his Program for Management article of June 29, Forecasting Business Trends.

John had a news contact, whom we shall call Smith, in a large Metalworking firm, which we shall call the "I-love-My-Job Metalworking Company."

During the course of an interview about a month ago, Mr. Smith made a point of the fact that the "I-Love-My-Job Metalworking Company" was a fine place to work and that among its employees were virtually hundreds who had been there for eons and ages . . . Mr. Smith among them.

John was impressed with Mr. Smith's information. As he mulled the conversation over in his mind, he thought he saw the fluttering thread of a real good yarn about the company's employee relations, etc. He picked up his phone, dialed the "I-Love-My-Job Metalworking Company" and asked for Mr. Smith.

"Sorry", replied the trained telephone voice at the other end, "Mr. Smith is no longer with our company. Will you speak with someone else?"

The thread had snapped. There was no longer a yarn to be spun here.

"Dogtite"

A top brass hat in Army Ordnance comments as follows on the microphotograph reproduced above which, by an odd arrangement, clearly shows a dog in a sitting position:

"The new microstructure discovered by Army Ordnance is suspected of being the cause of all gun failures over the past 100 years. This new microstructure has been christened 'dogtite' which name now takes its place alongside those of martensite, troostite, sorbite, pearlite, and the like. It was discovered at the Watervliet Arsenal as a result of unremitting search by the skilled metallurgists there for anything that will improve the quality of the weapons of this great democracy. This vital information now can be declassified." "The dog," he adds, "is not doing what you think."

Shrdlu

(Metalworking Outlook—Page 49)

SIMPLIFY PURCHASING...

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HACKSAWS

STARRETT

BAND SAWS

FAST-KUT

BAND KNIVES

1 THE COMPLETE LINE

Hacksaws, band saws and band knives in all types and sizes to meet all requirements . . . all from one dependable source.

2 MADE BEST TO CUT BEST

Precision made to insure correct set for clearance, exact size, uniform temper and maximum cutting ability.

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Stocked and sold by industrial distributors everywhere for prompt, dependable, on-the-spot service.

GUIDES TO LOWER CUTTING COSTS

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Buy THROUGH YOUR INDUSTRIAL DISTRIBUTOR

Prompt delivery
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Quality products

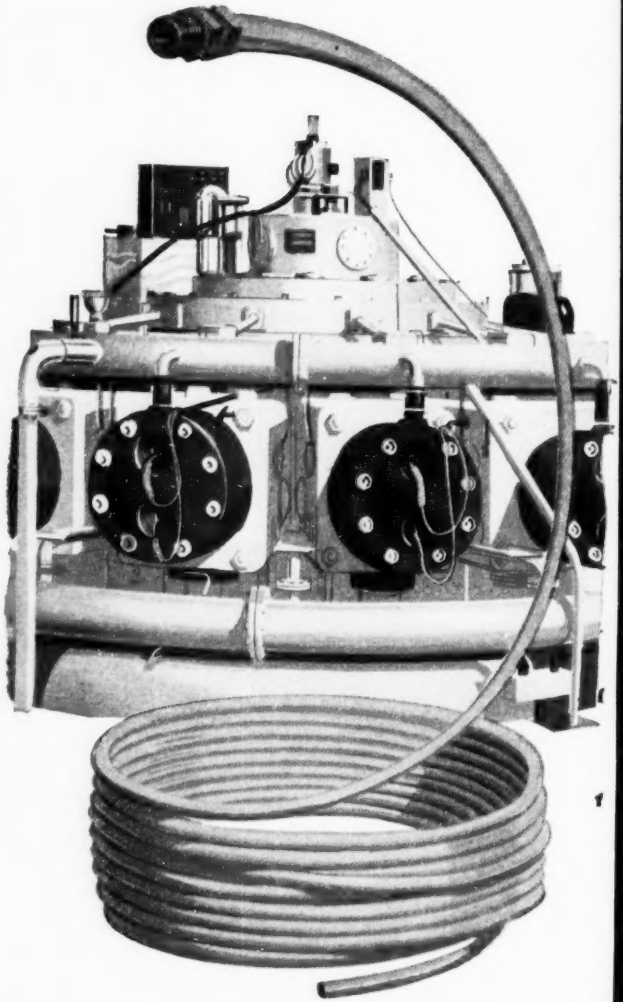
ALUMINUM IS *Why* YOU CAN SAVE 40 PER CENT ON COILED TUBE

For years industry has needed a coiled tube versatile enough to handle many jobs from instrumentation to fuel lines, inexpensive enough to justify its use anywhere. It's here. It's aluminum. Its name is ALCOA UTILITUBE℠.

ALCOA UTILITUBE is highly resistant to most industrial atmospheres, to hundreds of corrosive compounds as well. It will not form sludge or gum in service with gasoline or lubricating oils.

In installation, it is easy to form, flare and bend ... easier than annealed copper or 4S-0 aluminum. It also work-hardens less . . . stands up well under vibration (fatigue strength about the same as annealed copper) . . . offers a bursting pressure of 4240 psi in ¼-inch size.

Yet ALCOA UTILITUBE costs substantially less (about 40 per cent) per foot than copper ... less than other strong aluminum alloys.

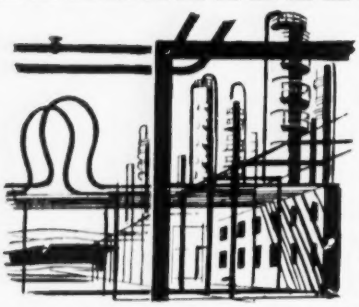


ALCOA IS *How*

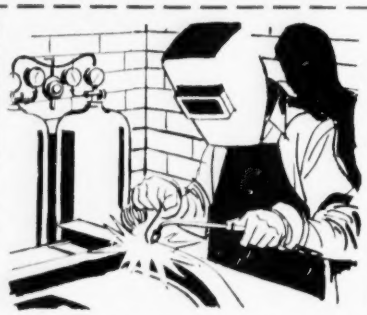
Alcoa engineers worked several years to create a brand-new alloy (50S) that combines just the right amounts of aluminum and magnesium to give UTILITUBE its unique properties. Alcoa researchers tested UTILITUBE's ultimate and yield strengths ... determined bursting pressures and how it behaved at high temperatures to give users a firm basis of fact on which to specify. Alcoa production men found ways to extrude the tube smooth and flawless in lengths 1,000 feet and more. Aluminum Company of America, 877-G Alcoa Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA



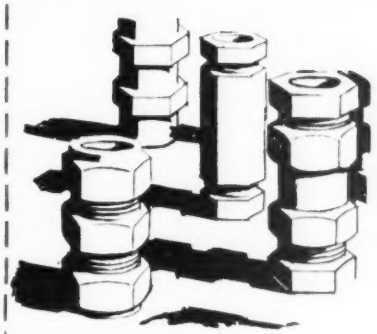
INSTRUMENT LINES of UTILITUBE are easy to form, flare and install. They cost less than lines of any other corrosion-resistant metal. UTILITUBE has high bursting strength and good properties and low temperatures.



WELDING GASES are safely carried in UTILITUBE. Its ductility makes cylinder exchange and connection easy for acetylene, oxygen, argon and hydrogen lines.

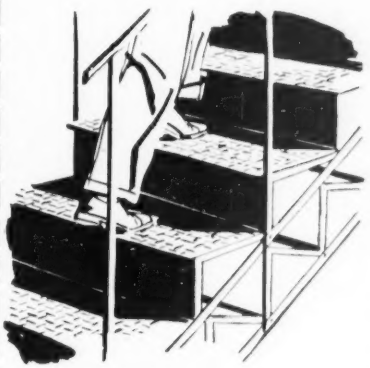
MACHINE TOOLS benefit from the low cost and easy workability of UTILITUBE for air, cutting compounds and coolants.

FABRICATING this double-wall fuse cap formerly involved an expensive welding operation. Now it is impact extruded by a single press stroke at Alcoa's Edgewater (N. J.) plant.



***SCREW MACHINE STOCK**—Aluminum Screw Machine Stock goes three times further per pound than heavy metals. It machines freely—won't rust—is widely used for fittings and fasteners.

***ALCOA COVERED WIRE** is widely used for secondary distribution and service drop cable. It is light, easy to install—costs far less than copper conductor.



***TREAD PLATE**—Strong Alcoa Aluminum Tread Plate is widely used in refineries and chemical plants because it is non-sparking—in trucks and tractors because it is lightweight.

***ALMOST ANY SHAPE** can be produced as an Alcoa Aluminum Extrusion—hollow, semi-hollow, solid. Extrusions put the metal where it's most needed, yet use less metal than rolling or fabricating by welding or riveting.

ALCOA ALUMINUM DIE CASTINGS can weigh one third as much as heavy metal castings, yet provide great strength. They are exceptionally easy to machine . . . take all finishes . . . often cost less.

Products marked* are available from your local Alcoa Distributor listed here

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COLORADO
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Edgcomb Steel Co.

OHIO
Cincinnati
Williams & Co., Inc.
Cleveland
Williams & Co., Inc.
Columbus
Williams & Co., Inc.
Toledo
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ONLY $270 BUYS A PACKAGE OF FULLY AUTOMATIC FIRE PROTECTION

Anyone who can measure volume . . . and can cut pipe . . . can install this ready-made fully automatic fire extinguishing system that requires no power source.

It includes Kidde's split-second rate-of-temperature-rise heat detector (the fastest detection known to the fire-fighting industry), Kidde's powerful Multijet nozzle and a 50-pound cylinder of fire-killing carbon dioxide. You even get a monometer tester. Pipe and fittings are optional.

Six Kidde Standard Paks are available for volumes from 800 up to 6,000 cubic feet.

All components of Kidde Standard Paks are the same as those used in Kidde custom-designed installations. The difference is that Kidde has pre-engineered the Paks for small hazards. And the savings on volume distribution are passed on to you!

You just can't beat Kidde Standard Paks for inexpensive night-and-day protection against normal flammable liquid hazards.

Remember, fire won't wait till you're ready. Better write today for full information.

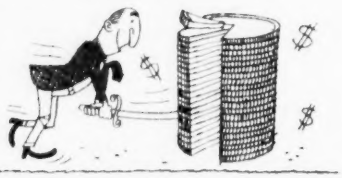
Kidde Walter Kidde & Company, Inc.

760 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

LETTERS TO THE EDITORS

Incentives Pay Off



I was quite happy to see your excellent article on the Reznor installation of the Rucker Share of Production Plan, "Incentives Pay Off at Reznor" (June 15, p. 50). It is particularly pleasing to know that you paid this company a personal visit, as we regard them as one of the finest performers of all the firms, American and foreign, using the Rucker Plan.

Would it be possible to have from you permission to reproduce this article? We naturally would want to give STEEL full credit.

A. W. Rucker
Eddy-Rucker-Nickels Co.
Cambridge, Mass.

• *Permission granted.—ED.*

News for Metalworking

This has been my first year as a subscriber to STEEL and before I received my fourth copy I had more than gotten my money's worth in information. Trusting this will continue, as I am positive it will, because you people can get the information and are not afraid to print it for the benefit of those it will be helpful to.

William A. Mitchell
19207 Charleston Ave.
Detroit

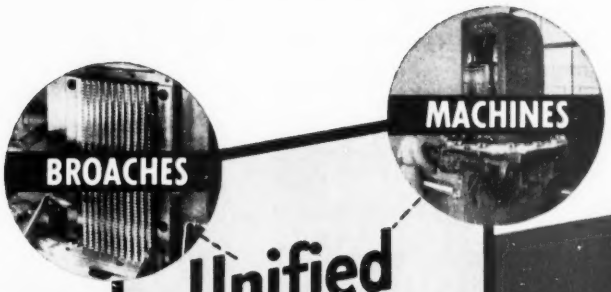
Chemical Equivalents Shown

Being manufacturers of chemical pumps, we are continually being asked, will your pumps handle sulphuric acid, nitric acid, etc. At times, we are at a loss to know what type stainless steel to use. We are very anxious to obtain a publication that will give us the answer, and I think, perhaps your Specifications Handbook may be that source. Can you enlighten me on the subject?

Harry P. Dilkes
president
Neptune Pump Mfg. Co.
Philadelphia

• *The Specifications Handbook does not contain data on corrosion resistance of various metals to the different acids. However, it does show equivalent chemical compositions of metals called for in various specifications. For example, if you had a pump order calling for a*

Please turn to page 12



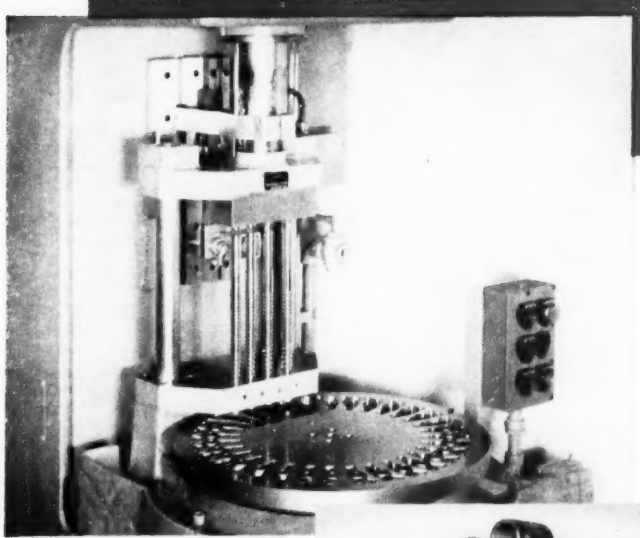
Unified Broaching

For Lower Costs...

the COLONIAL method

At Colonial, experience, imagination and competence are applied

1. to the design and manufacture of each of the individual components of a complete broaching installation, and
2. to the effective combining of ALL components into a completely UNIFIED BROACHING installation—making them work as a "team."



Broach 1200 Rocker Arms per Hour

Continuous strip-broaching and burnishing of 1200 automotive rocker arms per hour is achieved with minimum effort by a Colonial 10-ton, 36 in. stroke Utility Press. Operator merely loads fixture as it indexes past him. Broached rocker arms simply drop through slots in indexing table and out of chute.

Rocker arms are broached four at a time, approximately 0.010" stock being removed. Burnishers on the broaches permit fast strip broaching with long tool life.

Machines, broaches, fixtures, etc., were all designed by Colonial as a UNIFIED BROACHING INSTALLATION.

WHAT'S AHEAD IN BROACHING?

Keep up with the latest developments: Read "Broaching News". We will be glad to see you get it regularly if you will drop us a line on your company letterhead.

PIONEERS OF H.S.S. BROACHING

COLONIAL BROACH CO. DETROIT 13

120 PAGES PACKED WITH VALUABLE FACTS ABOUT CUTTING TOOLS

If you design or buy cutting tools, you'll find a "gold mine" of useful information in the Gorham Tool Catalog! Complete with pictures, application data and specifications covering such tools as:

- PLAIN MILLING CUTTERS
- HELICAL MILLING CUTTERS
- SIDE MILLING CUTTERS
- WOODRUFF KEYSEAT CUTTERS
- T-SLOT CUTTERS
- SAWS
- ROTARY SHEARS
- SCREW SLOTTING CUTTERS
- ANGLE CUTTERS
- END MILLS
- CONCAVE CUTTERS
- CONVEX CUTTERS
- CORNER ROUNDING CUTTERS
- TOOL BITS AND CUTOFF BLADES
- WORK REST BLADES
- SPECIAL SAWS
- WEAR-RESISTANT CENTERS
- HALF-CENTERS
- SPECIAL HIGH SPEED TOOLS
- RAILROAD TURNING TOOLS
- INSERTED BLADE CUTTERS
- SPECIAL CARBIDE TIPPED TOOLS

PLUS A 30-PAGE SECTION OF ENGINEERING DATA Covering:

Methods of holding circular form tools • Calculation of circular form tools • Calculation of flat form tools • Designation of nose elements of single point cutting tools • Speeds and feeds • Controlling cutting tool performance • Cutting tool clinic • Brown & Sharpe tapers without tongues • Brown & Sharpe tapers with tongues • Morse tapers • Jarno tapers • Keyway chart (This section is included in the complete catalog. It can also be obtained separately for distribution among your tool designers and setup men.)

The Gorham Tool Catalog and as many extra copies of the section on Engineering Data as you can use are yours without obligation. Tell us how many of each you need, on your company letterhead.

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14401 WOODROW WILSON • DETROIT 3, MICHIGAN

WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif.

LETTERS

Concluded from page 10

metal of one specification and wished to know the specification of metals with similar composition, this information could be found in the Handbook.—ED.

Please accept my grateful thanks for the copy of STEEL's Specifications Handbook. The Birmingham Technical Library is constantly receiving inquiries for information about American steel specifications which is often extremely difficult to locate. A glance at your Handbook tells me that it will remove most of our difficulties in this field.

F. J. Patrick
Birmingham Public Libraries
Birmingham, England

Guides for Buyers

Your "Guide for Stainless Steel Buyers" (June 22) is now in my possession and I believe it will prove very helpful in the purchase of stainless steel types.

As the majority of our steel buying here, however, is carbon steel and alloy steel, we are wondering whether a buyer's guide for these products has been published.

H. O. Moery
assistant buyer
Warner Gear Division
Borg-Warner Corp.
Muncie, Ind.

• *A similar guide covering carbon and silicon steel was published in the Jan. 15, 1951 issue of STEEL. A guide covering tool steels and carbides appeared in the June 16, 1952 issue of STEEL. We have produced no guide on alloy steel.—ED.*

Cost of Doing Research

I have been told that you had a summary of the amount of money being appropriated for development and research by various manufacturing companies. If my understanding of this is correct, I would appreciate receiving a tear sheet of the summary.

J. J. Ryan
Portable Fire Protection
Rockwood Sprinkler Co.
Worcester, Mass.

• *In STEEL's No. 3 of a Management Series, "Receipe for Profit: Organized Research," there is a breakdown of research costs as a percentage of sales for various industries. A reprint of that article has been sent.—ED.*

I am very much interested in your article "Recipe for Profit: Organized Research" (Apr. 27, p. 55), No. 3 of a Management Series.

I would appreciate having 4 reprints if available.

R. S. French
chief research metallurgist
Bridgeport Brass Co.
Bridgeport, Conn.

Thanks for the Information

I would like to thank you for your continued co-operation and for your fine publication, STEEL, which has many informative articles and sections of interest to our plant personnel.

Thomas E. Franks
vice president, sales
General Alloys Co.
Boston

You?...

a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try... see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the industrial field prefer Roebling rope. Call the nearest Roebling office for a Field Man to suggest the best ropes for your purposes.

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Now... 36 Pieces Threaded Instead of 1

OTHER INDIRECT SAVINGS IN TOOL COST AND TOOL INVENTORY

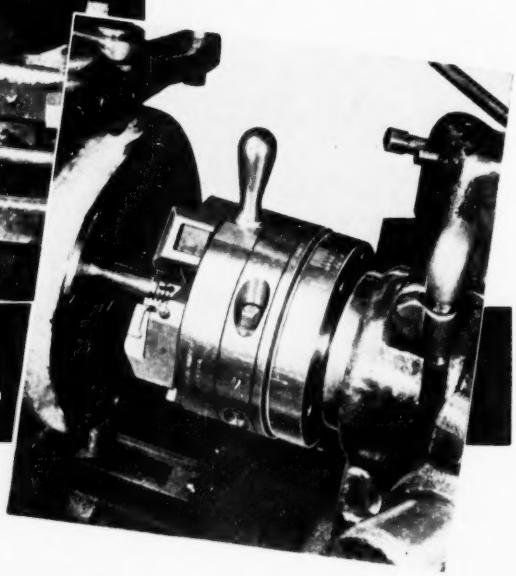
This manufacturer had cut threads on adjusting screws in the past by making several passes with a single point tool. Actual chasing time on the .623 in. diameter 8 pitch thread 1 3/8 in. long was 4.86 minutes.

LANDMATIC Die Heads were installed to perform these operations. Immediate savings were realized when actual threading time was cut to 8 seconds.

LANDMATIC Die Heads are well-suited to cutting these modified square threads. Rigid construction holds the chasers firmly—line contact with the work reduces friction and cutting strains—thus making it possible to produce the thread in a single pass.

Other savings accrued from LANDMATIC Heads. Interchangeable chasers can be reground singly, and for over 80% of their length. A single chaser can be replaced in the set. Chasers will maintain a more consistent thread form than a single point tool.

For more information about these cost-cutting tools, write for Bulletins F-80 and F-90.



LANDIS *Machine* CO.

WAYNESBORO • PENNSYLVANIA • U. S. A.

50th ANNIVERSARY

BEHIND THIS DOOR lies the secret . . .

of why your Heyl & Patterson Heavy Bulk Materials Handling Installation will last . . . and last . . . and last

Since 1887 Heyl & Patterson has designed, fabricated and erected well over 3000 Heavy Bulk Materials Handling installations of all types . . . from coal tipples to complete coal preparation plants . . . from pig casting machines to mammoth ore bridges.

Today the great majority of these installations are still in operation, including many that were built 50 to 65 years ago.

The H & P Service Department is an important factor in the consistent long life of all Heyl & Patterson installations.

Night or day, the Heyl & Patterson Service Department is prepared to go all out to supply H & P customers with replacement and spare parts in the shortest possible time.

This on-the-spot service is facilitated by Heyl & Patterson's system of recording all detailed drawings on 70 mm microfilm, which is available at a moment's notice.

Time and time again the H & P Service Department has done the "next to impossible" to keep H & P installations in operation. Letters of thanks from customers prove this to be the rule rather than the exception.

The operations of the H & P Service Department in working with the customer after a contract is completed is another example of the "follow-through" that your business receives at Heyl & Patterson . . . the "follow-through" that is possible because we have our own Engineering Department, our own Research Department, our own Machine Shop, our own Structural Shop, our own Erection Department and our own SERVICE DEPARTMENT.

All H & P departments work together to provide you with the world's finest Heavy Bulk Materials Handling Equipment.

Heyl + Patterson, Inc.

"SINCE 1887"

55 WATER STREET · PITTSBURGH 22, PA.

Heavy Bulk Materials Handling Equipment

All The Way from Design to Erection

NOW you can

BRIGHT-ANNEAL STAINLESS

on a continuous production basis, with The

SARGEANT & WILBUR Controlled Atmosphere

CONVEYOR FURNACE

PARTS MADE OF STAINLESS can be

BRIGHT-ANNEALED,

BRIGHT-HARDENED, or

BRIGHT-BRAZED without oxidation . . . they come out scale-free, bright, and clean. No pickling required, no tumbling, no sand blasting.

With our special S. & W. alloy for bright-brazing stainless, the color matches the metal; resists dulling; and the joint is practically invisible. *Gold and silver parts* are soldered in the same continuous-production furnace with equal success.

Your samples processed free. If you want to see some of your own work bright-annealed, bright-hardened, or bright-brazed in a conveyor furnace, send us samples and specifications.

SARGEANT & WILBUR, INC.
180 Weeden St.
PAWTUCKET, R. I.

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Production Pointers from GISHOLT

TIME-SAVING IDEAS

Presented as a service to machine shops, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your metal work.

GOOD TWIST FOR ROTOR COUPLINGS

Centering and Holding Simplified by Splined I.D.

This user solved several problems at once . . . by the application of a splined arbor to chuck these steel shaft couplings for turbine rotors. This method provides the firm holding needed for a heavy forming cut, taper boring and other machining. The machine is a Gisholt No. 4 Ram Type Turret Lathe.

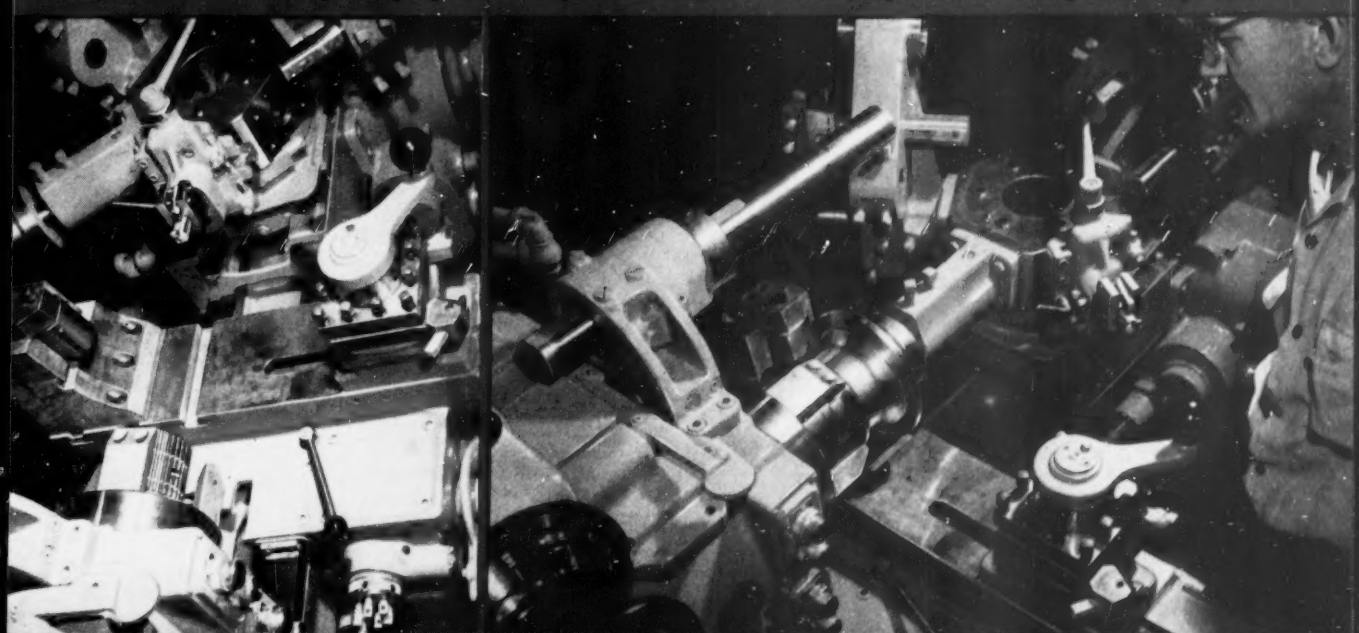
The workpiece is slipped on the arbor against three stops. The splined arbor has a center section that rotates slightly, locking the two splined surfaces snugly to eliminate all play.

The heavy forming cut is done with a dovetail forming tool on the rear of the cross slide. During this cut the workpiece is supported with a live center mounted on the hexagon turret.

The taper attachment is placed on the front of the cross slide carriage and bores the conical inside surface with the cutter in the square turret. The balance of machining is conventional and is done by tools on the hexagon and square turrets.

On this tough steel workpiece, the tolerances are close, a lot of chips are made . . . yet the No. 4 Ram Type Lathe does the job in only 10.7 minutes, f.t.f.

Splined arbor with rotating locking segment. Setup for machining rotor shaft couplings. Here, the forming cut is being made.



GISHOLT

TIME-SAVING IDEAS

SMART CHUCKING AND TOOLING COMBINE TO CUT COSTS

DANLY Handles 32 Different Parts on ONE Simplimatic

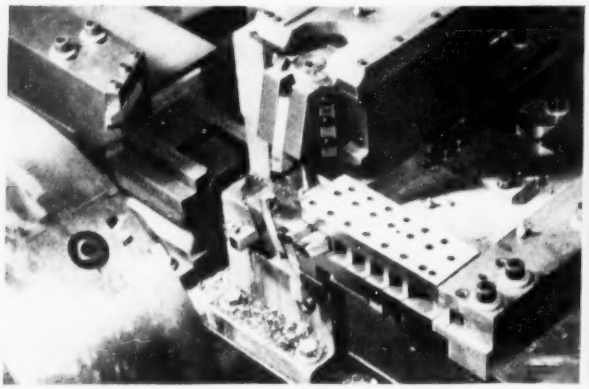
High production of 32 different parts on *one* machine is a neat trick to cut costs—if you can do it . . . particularly when you have square and rectangular shapes to chuck. But Danly Machine Specialties, Inc., largest producer of die maker supplies, is doing it.

The job is machining punch holders . . . and the machine is a 3D Simplimatic Automatic Lathe. The problem of chucking the 32 different sizes was solved by a duplex chuck having two pairs of self-centering jaws which work independently of each other.

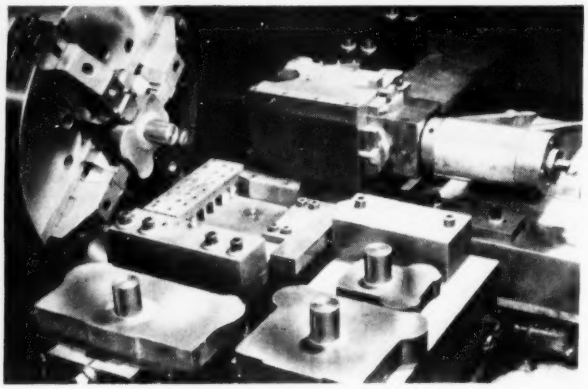
An important aid to production is the front slide with provision for adding tools to accommodate tool travel on the various size workpieces. All 32 types of punch holders are handled simply by inserting or removing tools as necessary.

For the finishing operation, the Simplimatic has a variable speed motor. As the rear slide tool approaches the hub and the diameter diminishes, spindle speed increases. Thus, cutting speed is essentially the same for the entire face of the workpiece.

In this interesting setup, 32 different size parts are handled simply by repositioning chuck jaws and adding tools to the front slide.



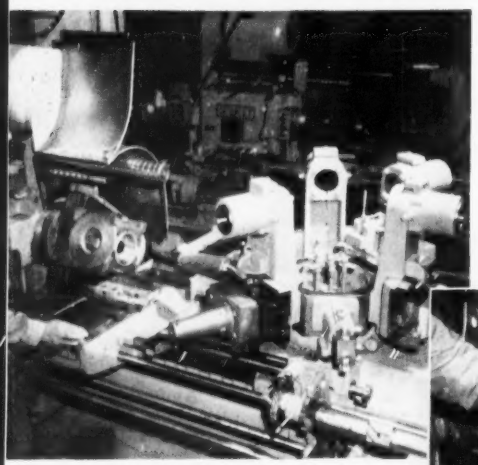
Jaws of chuck operate in pairs to center parts. Note typical workpieces in foreground.



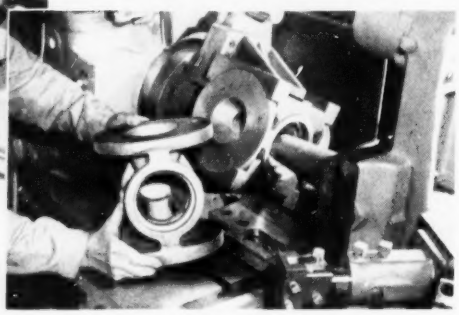
Tooling for machining steel punch holders. Time for workpiece with this setup is only 2.33 minutes.

VALVE BODY PRODUCTION . . . *ON THE DOUBLE*

Features Single Point Tools Instead of Reamer



2F Fastermatic tooled to machine variety of valve bodies.



Operator holding typical valve body. Note cam-guided boring tool, slide-mounted, on hexagon turret.

Note how this user machines both cast iron and steel plug valves, in a variety of sizes, with this Gisholt 2F Fastermatic Automatic Turret Lathe. The first turret station has a loading arbor to carry the workpiece into proper position for chucking.

Five or six hexagon turret stations are used, depending on the kind of valve body being machined. The tapered seat for the plug is rough and finish bored with single, horizontal slide tools mounted on the hexagon turret. These are guided by an angular cam on the cross slide and held tightly against the cam by sustained air pressure.

In addition to the taper bore for the valve plug, there is boring, facing, and on some workpieces, grooving. Floor-to-floor time for the 2" valve body shown is 11.5 minutes. A single operator easily handles two machines.

The internal taper diameters of these plug valves are bored with repetitive accuracy and finish by cam-controlled single point tools, rather than the usual reamers.

GISHOLT

TIME-SAVING IDEAS

FOUR OPERATIONS ON TWO PIECES WITH SIMPLE CHANGEOVER

Shows Versatility and Speed of No. 12 Hydraulic Lathe

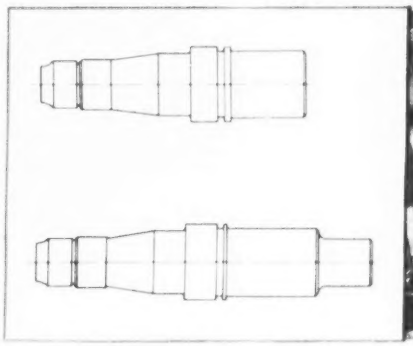
Two different workpieces, each requiring machining on both ends, are handled here with fast, easy changeover. The parts are suspension spindles of nearly equal diameter, but of different lengths. The Gisholt No. 12 Hydraulic Automatic Lathe is the machine handling both.

The parts are held between centers and rotated by an automatic workdriver. Variation in the lengths of the two workpieces is provided for by the use of different tailstock centers. By this method the rear independent slide always remains in the same position—minimizing changeover time. Extra dwell for the rear independent slide tools is obtained through an adjustable stop-block. This is screw mounted on the slide and actuates a switch that starts a timer. The timer operates through the main control valve, returning the slide at the end of the timer cycle.

All turning operations on either end of both workpieces are done from the front carriage. Tools on the rear independent slide handle all grooving, facing and chamfering. Time for the first operation on both spindles is 1.60 minutes. For the second operation, floor-to-floor time is 2.00 minutes for both workpieces.

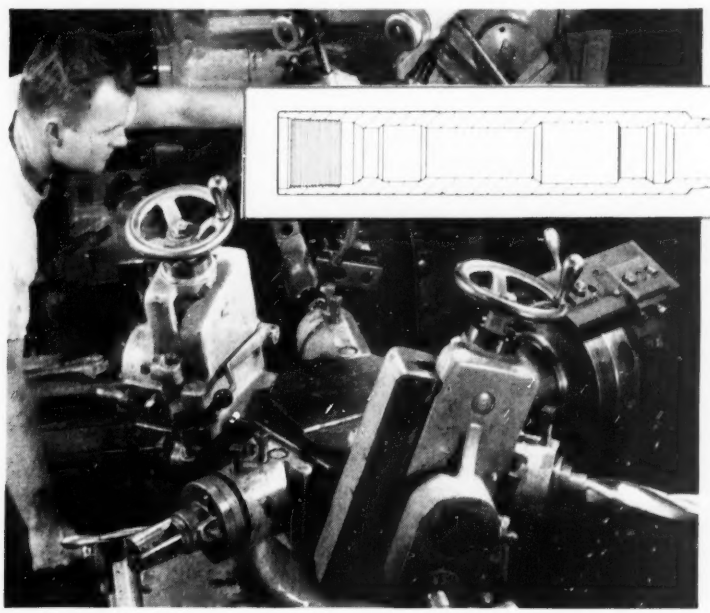
Here's an example of fast, automatic production, with simple changeover on two different parts of varying lengths.

First operation setup for small spindle. Second operation has similar machining on both size spindles.



SIMPLE SWITCH BOOSTS PRODUCTION 50%

Turret Lathe Brings More Tools to Bear on Work



Setup that increased output 50%

One tool at a time is fine . . . up to a point. When you begin to get into a variety of surfaces, such as here, it's time to change.

That's exactly what Otis Engineering Corporation, Dallas, Texas, did in the machining of these stainless steel landing nipples used in deep oil-well work. By taking the job off an old lathe and putting it on a modern Gisholt 2L Saddle Type Lathe with multiple tooling, they were able to make an immediate production increase of 50%.

Everybody is happy about it: The firm, because the machine gives a full 95 hours per week of *lower-cost* production — and the operator, Richard N. Crawford, who says, "This is one of the best turret lathes of any type I've ever operated."

With all stations of the hexagon turret working, this two-operation job is completed 50% faster than by old method.

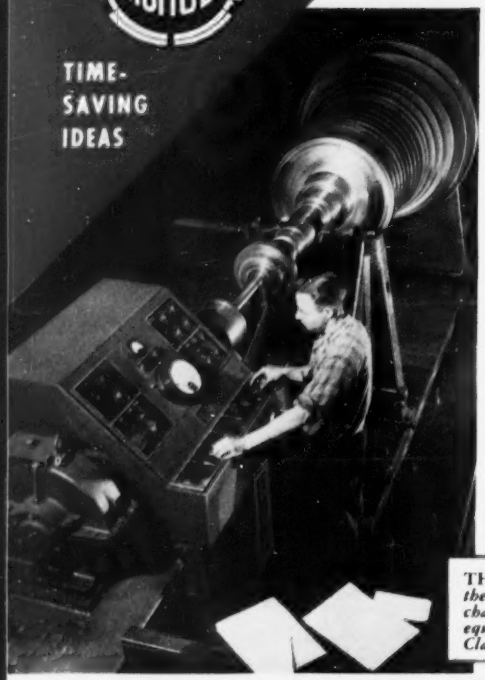
GISHOLT

GISHOLT

TIME-SAVING IDEAS

SOLVED: *A WEIGHTY BALANCING PROBLEM*

5-Ton Turbine Rotors Corrected to Accuracy of 2 Ounce-Inches



De Laval Steam Turbine Company, Trenton, N. J., had a three-fold problem in balancing these large marine turbine rotors:

1. Accurate balancing
2. Correction at a rapid rate
3. Prevent scoring of journals

By dropping an older method and doing the job on a Gisholt DYNETRIC Balancer, De Laval answered all three requirements with one machine. The 16-stage rotors weigh 10,000 lbs. and measure 95" in length and 70" in diameter.

The balancing and correction functions are tied together. The rotors are balanced to an accuracy of 2 ounce-inches by making correction on two balance rings: On one, excess metal is ground off the heavy side. On the other, where it is not possible to remove material, correction is made by adding plugs of predetermined weight to tapped holes.

In the former balancing method, journals were scored as a result of being carried on rollers. This made it necessary to refinish the journals after balancing. The Gisholt Balancer ended this trouble because the workpiece is properly carried on half bearings.

As to the performance of the Gisholt Balancing Machine, the manufacturer reports, "This Gisholt Balancer replaces one of another type. We now have a safer and faster operation to give us the accuracy we require. The half bearings in the work support have eliminated the scoring of journals."

Faster, more accurate balancing of rotors by this Gisholt DYNETRIC Balancer pays off in smooth, vibrationless operation, longer life.

DYNETRIC BALANCERS — GISHOLT

THE GISHOLT BALANCING SCHOOL *teaches the supervisor to plan for faster setups, quicker changeover, and how to get more out of balancing equipment in every way. Write for information. Classes now in session.*

SUPERFINISHING IMPROVES QUALITY OF TRANSMISSION PARTS

Faster, Less Costly Than Former Process

How to achieve fine finish on these high-quality automatic transmission parts? This manufacturer turned to Superfinish—for speed, efficiency and low cost.

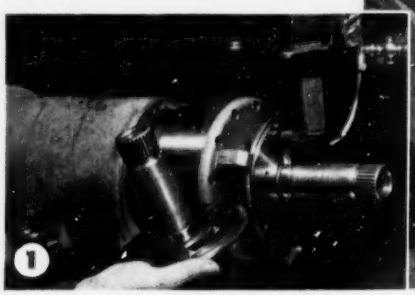
Here's how it's done:

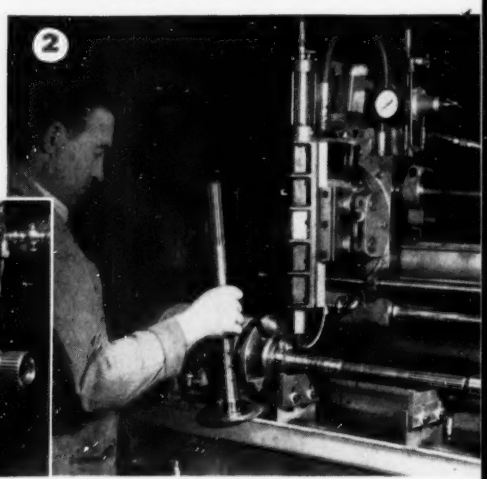
First photo shows a flanged hub in the Gisholt 52-A Superfinisher. To hold the assembly, the chuck is mounted on a special face plate. The Superfinish Stone-Carrying Quill has extra travel to provide clearance for easy loading and unloading. For Superfinishing the bearing surfaces, two speeds are used—a 10-second roughing cycle and a 15-second finishing cycle. Except for the loading and removing of parts, the machine is fully automatic with a predetermined and adjustable cycle.

To do the shafts shown in the second photo, changeover is this quick and easy: The chuck is removed, and a standard driving plate is mounted on the spindle. Loading of the longer workpiece is aided by two adjustable loading rails. The workpiece is held between a headstock dead center and a tailstock live center.

Superfinishing cycle-time is the same for both parts. Production is at the rate of 70 per hour at 80% efficiency. In both cases, bearing surfaces are Superfinished to 3 to 4 micro inches R.M.S. from a ground finish of 15 to 20 micro inches R.M.S.

In one fast, automatic operation, Superfinish rids vital bearing surfaces of smear metal, grinder flats, etc., to insure smoother, longer life. Here's not only low production cost, but also low machine investment.





No. 7-853
613

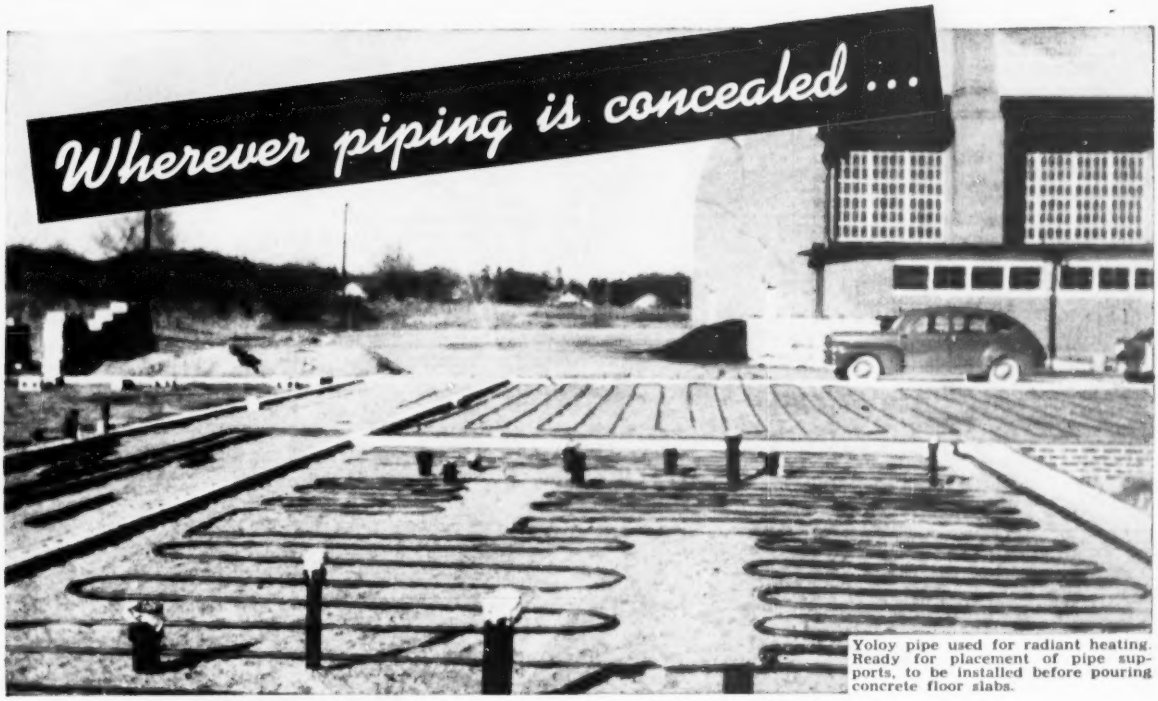
THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Write for your copy of Gisholt's new general catalog.

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Wherever piping is concealed . . .



Yoloy pipe used for radiant heating. Ready for placement of pipe supports, to be installed before pouring concrete floor slabs.

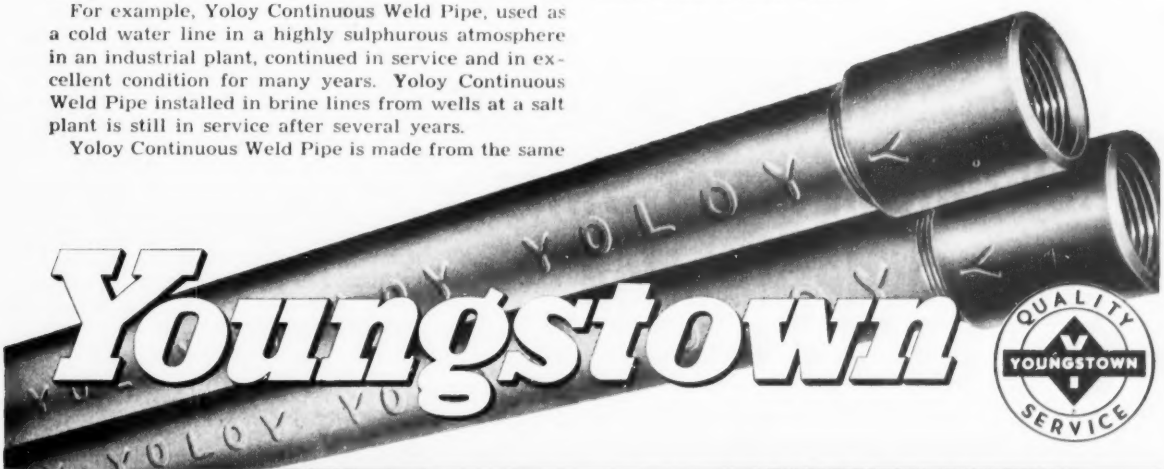
use YOLOY *continuous weld pipe*

Yoloy Continuous Weld Pipe offers distinct advantages for radiant heating and snow removal. Its use is recommended whenever piping is concealed—in industrial plants, commercial buildings, hospitals, schools and residences.

In standard tests Yoloy steel has demonstrated that its resistance to atmospheric corrosion is four to six times greater than that of regular steels. In actual installations Yoloy Pipe has demonstrated that it has a high resistance to many other corrosive conditions.

For example, Yoloy Continuous Weld Pipe, used as a cold water line in a highly sulphurous atmosphere in an industrial plant, continued in service and in excellent condition for many years. Yoloy Continuous Weld Pipe installed in brine lines from wells at a salt plant is still in service after several years.

Yoloy Continuous Weld Pipe is made from the same nickel-copper steel composition that has proved so successful in service in the oil, mining, railroad, chemical, trucking and other industries where resistance to corrosion and abrasion is of prime importance. This pipe is easy to thread and fabricate with standard pipe tools. It can be electric or gas welded readily. It has high strength and high resistance to abrasion, shock and vibration fatigue. For further information, write or phone the Youngstown District Sales Office nearest you.



Youngstown

QUALITY YOUNGSTOWN SERVICE

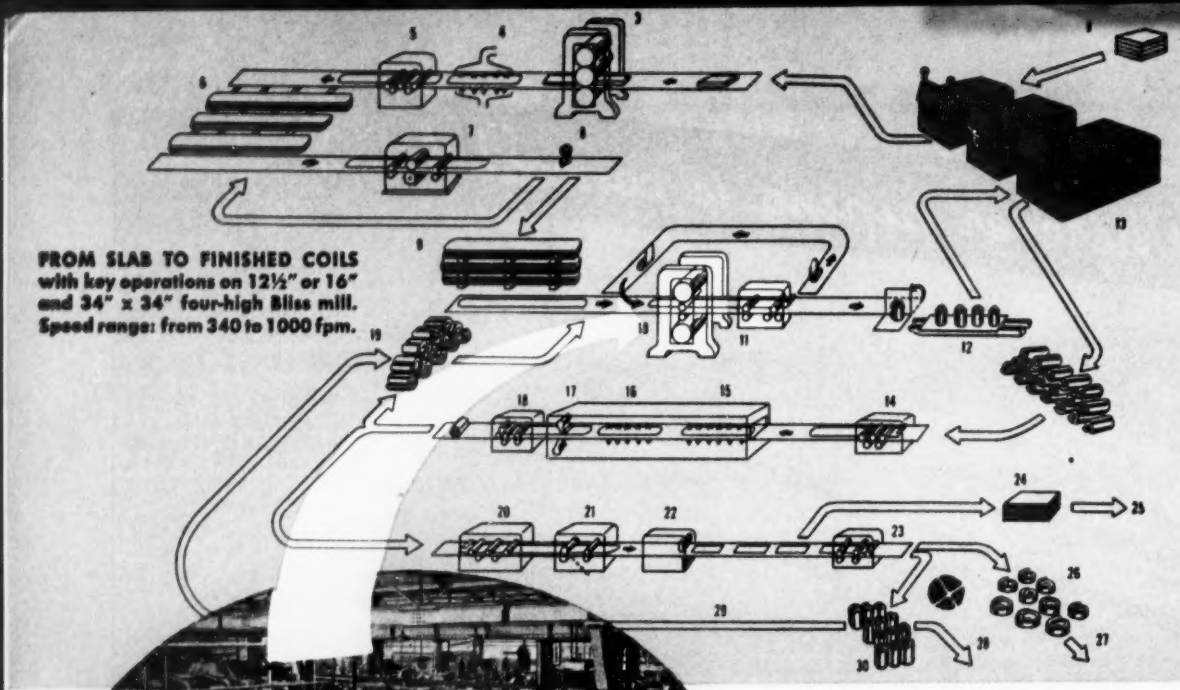
THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices — Youngstown 1, Ohio

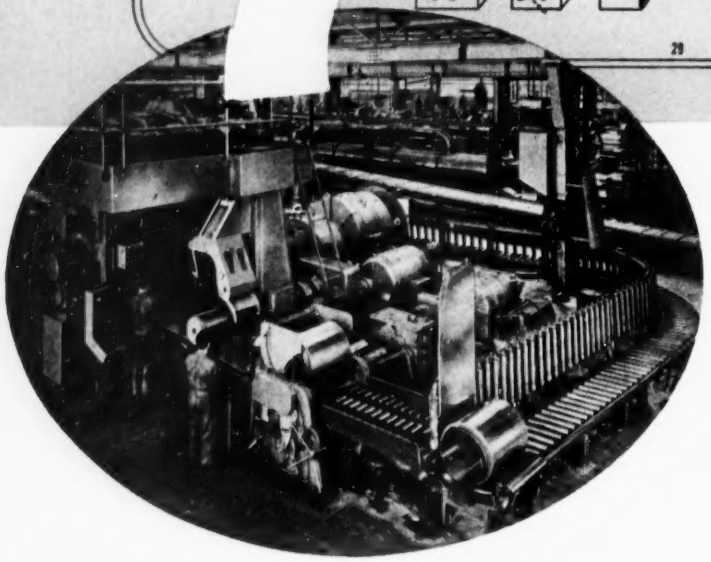
Manufacturers of Carbon, Alloy and Yoloy Steel

Export Office - 500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.



FROM SLAB TO FINISHED COILS with key operations on 12½" or 16" and 34" x 34" four-high Bliss mill. Speed range: from 340 to 1000 fpm.



New BLISS Mill is key unit in major Swiss plant modernization

When Metal Works Ltd., Dornach, Switzerland, decided to modernize their rolling mill equipment after World War II, they made a detailed study of American and European machinery and methods. Findings proved that a new four-high cold mill would be the most important unit. Exacting specifications for this cold mill were established. Then various designs were studied. *Their choice – Bliss'* versatile four-high mill design.

Here's why: The single Bliss Combination Run-down and Finishing Mill would deliver an output equal to that of 12 old mills... give seven times the speed range ...more than double the reduction capacity. In addition, its rigidity and built-in controls would enable the Bliss mill to deliver finer tolerances than heretofore possible. Result: Officials of Metal Works Ltd., report that "the mill was very quickly in full operation with a minimum of teething problems... the heavy specification has been more than paid for."

Developing the right mill design for a given set of production conditions has been a highlight of Bliss engineering for many years. Next time you have a mill problem, call for a Bliss engineer. Meanwhile, write for your copy of Bliss' 52-page brochure – Bulletin 40.

E. W. BLISS COMPANY, General Office: Canton, Ohio
ROLLING MILL DIVISION: SALEM, OHIO
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Ouen sur Seine, France

U. S. Plants in Canton, Salem, and Toledo, Ohio; and Hastings, Michigan
Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. *West Coast Representatives:* Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Co., Seattle. *Other dealers in* United States cities and throughout the world.

***Remember:* for Presses,**
ROLLING MILLS, Special Machinery...

It's Bliss

NS
WORCESTER
WIRE WORKS
Division
NATIONAL-STANDARD COMPANY

NS
ATHENIA
STEEL
Division
NATIONAL-STANDARD COMPANY

these National-Standard Divisions

specialize in making wire and steel do a better job at lower cost

YOU might be surprised at the roster of leading manufacturers who turn to these National-Standard Divisions for small-size wire and high carbon flat steel for special purposes. The uses are endless—special wire for everything from bottle caps to zither strings . . . steel for countless products from harmonica balancers to surgical instruments and springs for the finest watches.

Perhaps *you* are one of the manufacturers who has found that here research and development dig deeper, go further . . . that here the actual processing of steel and wire is held to a hair line of quality and uniformity.

These things invariably pay off for National-Standard customers in production economies and better product behavior. If you don't *know* National-Standard, or about National-Standard services, we'll be happy to talk over your particular needs or send you a bulletin covering the work and specialties of any of the divisions listed below.

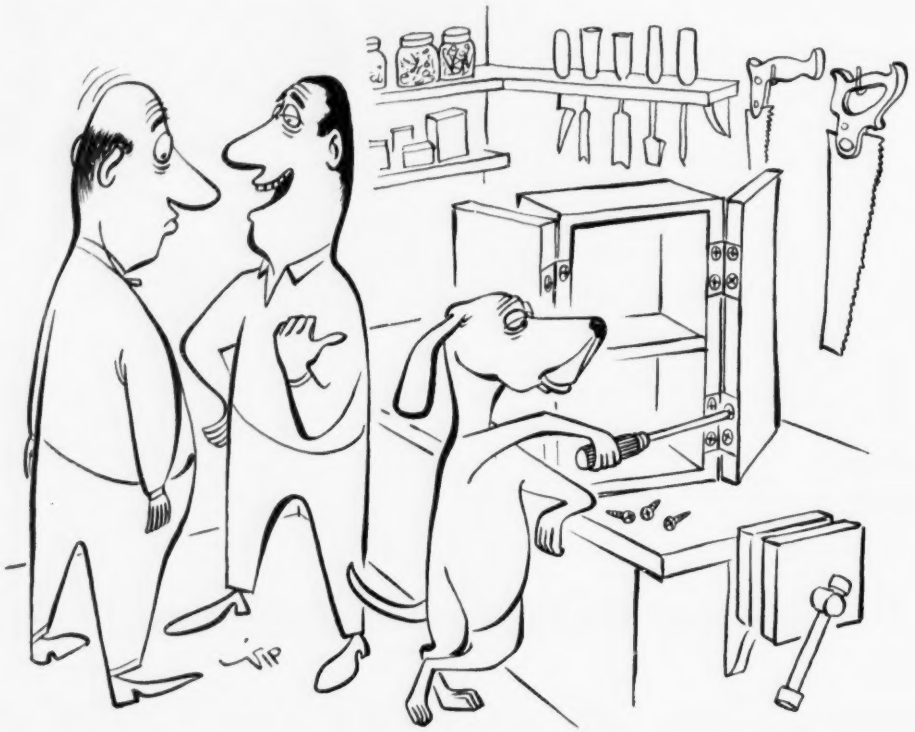
NS
NATIONAL-
STANDARD
Company
NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

What's Screwy?

by Phillips



"Oh, he's not so smart. It's just that those Phillips Screws are so easy to drive."

PERFECTLY MATED!
Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

EASE of driving is only *one* big advantage. Phillips Screws save time, work and money. They also add structural strength, set up tighter, resist the loosening effect of vibration. And they eliminate driver skids, damaged parts and split screw heads.

The identifying X on the cross-recessed-head identifies the x-tra quality of Phillips Screws instantly. Be sure to state "Phillips" on the specifications.

PHILLIPS *Cross-Recessed-Head* SCREWS

X *marks the spot... the mark of extra quality*

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY
ELCO TOOL AND SCREW CORPORATION • GREAT LAKES SCREW CORPORATION • THE H. M. HARPER CO.
THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY
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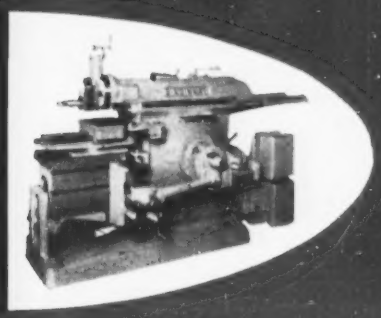
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHINGTON HDWE. MFG. COMPANY
STERLING BOLT COMPANY • STRONGHOLD SCREW PRODUCTS, INC. • WALES-BEECH CORP.

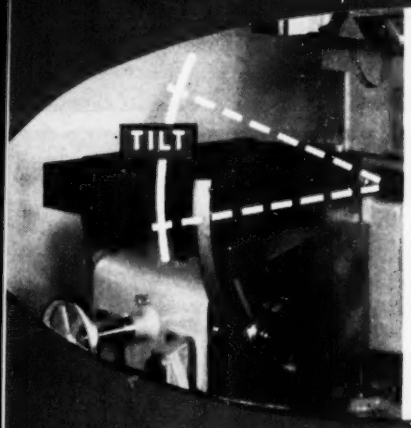
TODAY'S . . . AND THE FUTURE'S . . . FINEST FASTENER

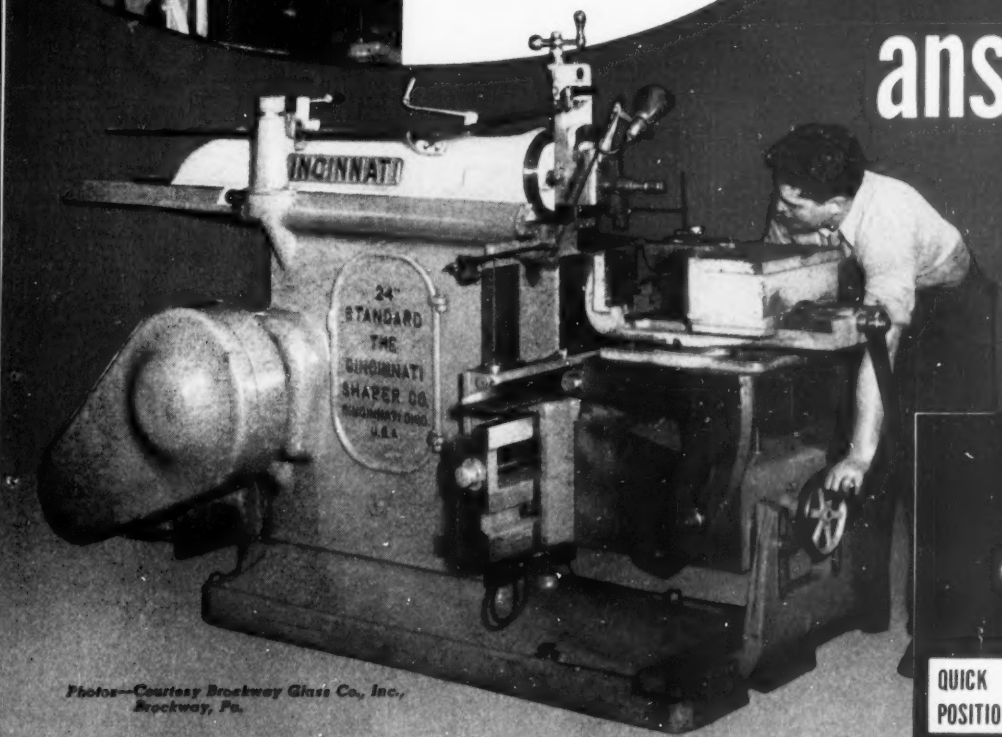
a CINCINNATI Shaper...



with tilting table...

was the answer!



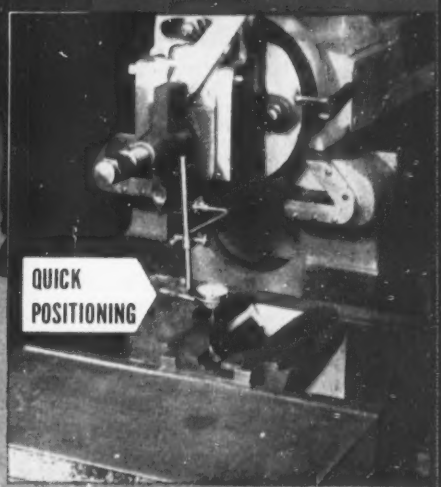


Photos—Courtesy Brockway Glass Co., Inc., Brockway, Pa.

Glass molds at the Brockway Glass Co., Inc., must be produced with very close fits on matching surfaces, and with minimum metal removal.

A Cincinnati Shaper, with special tilting table, positions the work so quickly and accurately that "flash" in molding is reduced, setup time is cut, and the useful life of molds is lengthened through the minimum metal removal.

A versatile Cincinnati Shaper, with simple fixtures, low cost tooling and accurate performance, may reduce costs in your shop.



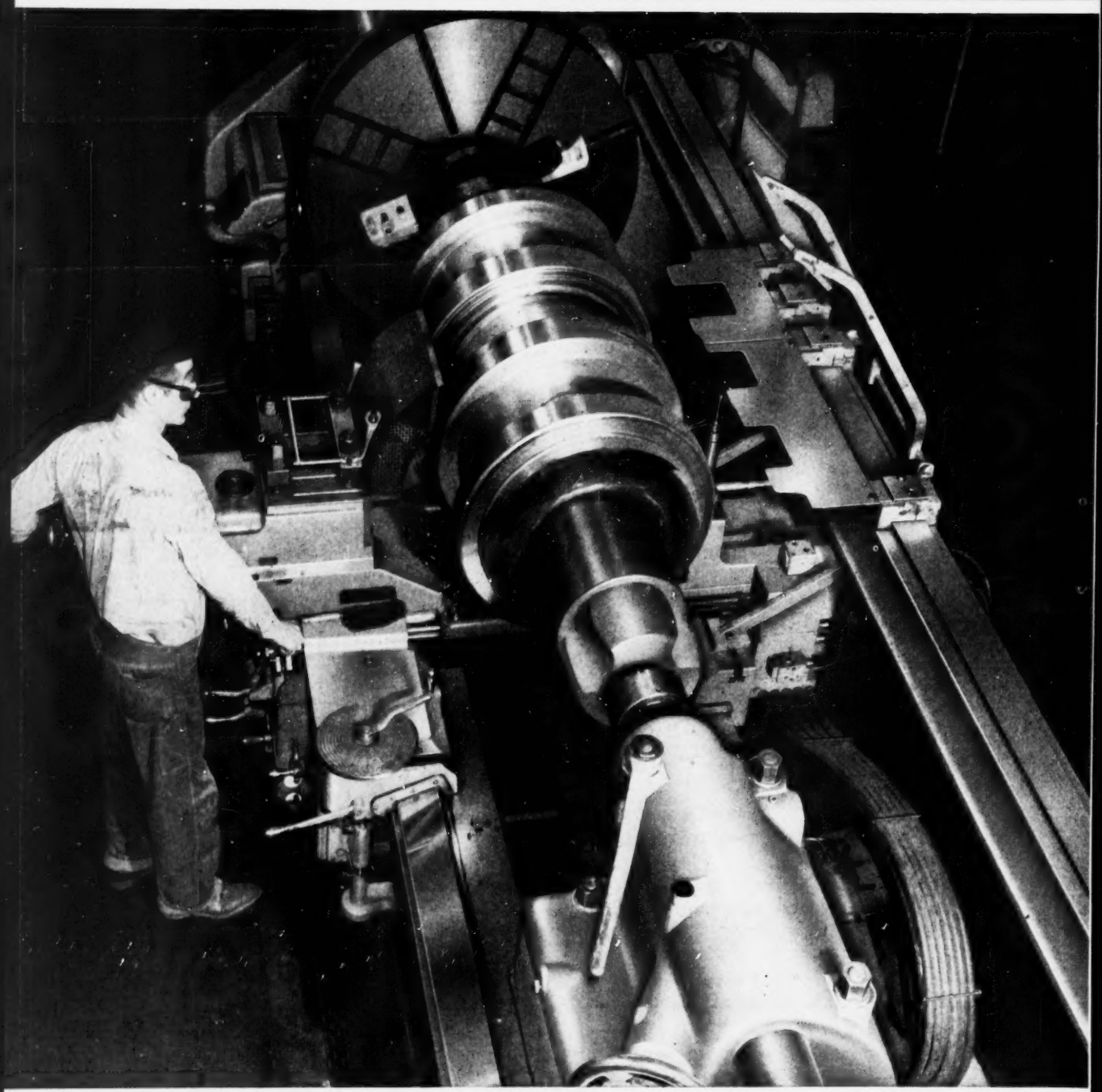
Glass molds are quickly positioned for skim cut with the Cincinnati tilting table.

Write for Cincinnati Shaper Catalog N-5.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

LeBlond Lathe eases cost squeeze ...on rolls that

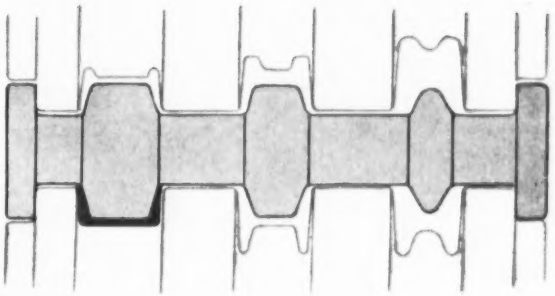


Shape rolls of 30½" dia. x 51" body cast alloy semi-steel are turned to .005" tolerance in 94 hours on this 50" LeBlond Roll Contouring Lathe. Set-up time—¼ hour. Clamped-on and brazed-on carbide tips are used at 48 rpm, .040 ipr feed. Conventional roll lathe took 245 hours for the same job.

squeeze channels from ingots

U. S. Steel Lops 151 Hours Off 245-Hour Roll-Turning Job.

Every day at U. S. Steel's Clairton Works, Clairton, Pa., miles of "hotter-than-orange" steel are squeezed through the passes of rolls like these for reduction, elongation, shaping. They come out as finished structural steel for the "jungle-gym" frameworks of modern buildings. Turning these costly shape rolls with their steep-angle contours used to keep a lathe running *245 hours on a single roll* at U. S. Steel. Tool life was short and the job required highly skilled operators. Stepped-up schedules called for a new solution to this tough-nut production problem.



Typical roughing rolls for 8" channel

A LeBlond 50" Roll Contouring Lathe, purchased through Pittsburgh Distributor Barney Machinery Co., immediately slashed the 245-hour turning time by an astonishing 61.7%. Now U. S. Steel *saves 151 hours on each roll*—more than enough time to turn out two more just like it. Tool life is greatly improved and less experienced operators can handle the work.

The 50" LeBlond Roll Contouring Lathe is equipped with two-directional hydraulic tracing. A single valve automatically controls two hydraulic motors for cross and length feed. A stylus follows a flat template mounted at the back of the lathe. Feed and speed can be varied during a cut without leaving a tool mark. For roughing, hydraulic cross feed can be by-passed and length feed used separately. This enables operator to cross feed manually, use template as length stop. Mechanical power rapid traverse to carriage and cross slide is also provided. All controls are located conveniently at the apron. The lathe uses a 40 constant horsepower DC motor, has nine speed changes in the headstock, delivers infinitely variable speeds from 1 to 165 rpm.

Whether your turning jobs involve specialized production like roll-turning, or call for high precision, high production—investigate LeBlond's complete line of 76 lathe models. LeBlond engineers will help you get a better turning job, faster. Write today or see your nearby LeBlond Distributor.

Ask for complete information on Roll Contouring Lathes in 25", 32", 40" and 50" sizes.

Turned faster by

LeBLOND *of Cincinnati*

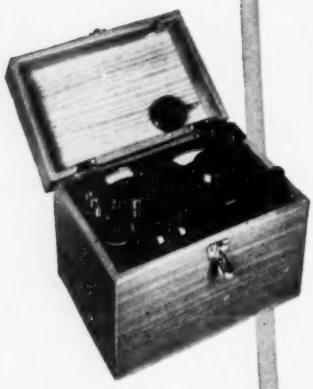
THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 66 YEARS*

FOR

"on-the-spot" checking...

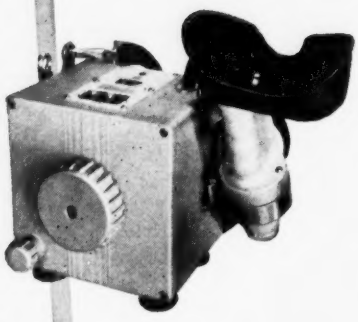
INVESTIGATE THESE WIDELY-USED TEST SETS



In appearance, the 8657-C Indicator is typical of L&N portable test sets and is outstanding for fully dependable, moderate precision. The portable series also includes instruments for measuring temperature, electrolytic conductivity, electrical resistance and pH.

High on any list of "musts" for making spot-checks of production processes and equipment are these L&N Test Sets. For these versatile instruments combine the portability, ruggedness and simplicity of design needed for plant use, with the accuracy and flexibility necessary for use in the laboratory.

Specifications for just a few of these instruments that are particularly useful to the Metal Industry appear below. For more complete information, contact our nearest office or write 4957 Stenton Ave., Phila., Penna.



The 8623 Optical Pyrometer —Direct Reading in degrees, this compact instrument enables users to measure the temperature of molten metals accurately and quickly.

FOR THERMOCOUPLE EMF MEASUREMENT

Instrument	List No.	Range	Limit of Error
Double-Range Portable Millivolt Indicator. For plant use. For thermocouple voltage measurements — reads in millivolts; manual reference junction compensation.	8657-C	Ranges: 0 to 16 mv and 16 to 64 mv. Reference Junction Compensator Ranges: 0 to 1 mv and 0 to 5 mv.	Low Range: ±0.05 mv. High Range: ±0.15 mv.

Double-Range Portable Millivolt Indicator. For Laboratory use. A more precise instrument for uses similar to 8657-C.	8662	Ranges: 15 x 1 mv + 1.1 mv slidewire 15 x 5 mv + 5.5 mv slidewire Reference Junction Compensator Ranges 0 to 1 and 0 to 5 mv.	Low Range: ±0.01 mv. High Range: ±0.05 mv.

FOR pH AND REDOX MEASUREMENT

Stabilized pH Indicator — for direct reading in pH; also for redox measurements. May be used in grounded or ungrounded solutions. For 115-volts, 60 or 50 cycles supply. Portable, Battery operated Model is No. 7662.	7664	0 to 14 pH; 0.1 pH divisions 0 to ± 700 mv; d-c; 5 mv divisions 0 to ±1400 mv; d-c; 10 mv divisions	1 scale division

FOR TEMPERATURE MEASUREMENT

Instrument	Type	List No.	Range	Scales
Optical Pyrometer For checking temperatures of molten iron, steel, etc.	Direct-Reading for Molten Metal Temperatures (Non Black-Body conditions — emissivity of 0.4)	8623	1400 to 3200 F	Two: 1400 to 2250 F 1960 to 3200 F
Optical Pyrometer For checking temperatures of flue linings, roof linings, etc.	Direct-Reading for Black-Body conditions.	8621	1400 to 3200 F	Two: 1400 to 2250 F 1950 to 3200 F

LEEDS NORTHRUP

instruments — *automatic controls • furnaces*

Journal Ad. No. E-0600(1b)

FARRELL-CHEEK

HEADQUARTERS for WHEELS

HARD EDGE and F "85"

The Performance Alloys

FARRELL-CHEEK STEEL CO.

MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS
FARRELL'S HARD EDGE STEEL CASTINGS
FARRELL'S "85" STEEL CASTINGS

RAILROAD CASTINGS
Locomotive and Car
R R Specialty Castings

ELEVATOR, CONVEYOR PARTS
Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers.

BUSHINGS
Carbon and Alloy Steels Machined, Hardened, Ground.

CRANE WHEELS
Overhead, Gantry, Monorail, Ingot Car, Charging Machine

GEARS AND PINIONS
"True Tooth" Gears and Pinions, Sheaves and Wheels

SPECIALIZED CASTINGS
Light Section Castings

STOKER PARTS
Feed Screws, Furnace Tools
Flanged Pipe, etc

HEAVY HARDWARE
Wire Rope Fittings, Chokes Hooks, Bar Benders, Cutters

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

• • • **SANDUSKY, OHIO U.S.A.**

CLEVELAND Fabricating Tools

PUNCHES • SHEARS • PLANERS • DRILLS
BENDING or STRAIGHTENING ROLLS

WHATEVER your metal fabricating needs, chances are you'll solve them best with Cleveland engineered equipment. You can be sure of dependable, economical performance, for all Cleveland machines, both special and standard, benefit by our 75 years of experience in this field.

Shown here are a few of this extensive Cleveland line. We will gladly furnish you with complete specifications covering any type of Fabricating Tool in which you may be interested.

A-7631

Write for your copy of Cleveland Fabricating Tools!

THE CLEVELAND PUNCH & SHEAR WORKS CO.

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

CLEVELAND 14 • OHIO

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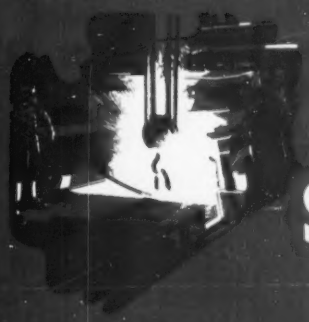
Ingersoll Steel



A DIVISION OF BORG-WARNER

a good name to Know ... a good place to Go

for the Special Steels you need

- Alloy steels
- Armor plate
- Carbon electric steel for hack clutch discs
- Chisel plate steels
- Heat-resisting steels
- Ingotized stainless-clad steel
- Knife steels
- Tool steels, including high speed hack saw blade steels
- Magnet steels
- Roll casting steel
- Stainless steels
- Twin-Cross steel
- Tillage steels

Specialists in Special Purpose Steels

ENGINEERING B-W PRODUCTION

INGERSOLL STEEL DIVISION

BORG-WARNER CORPORATION

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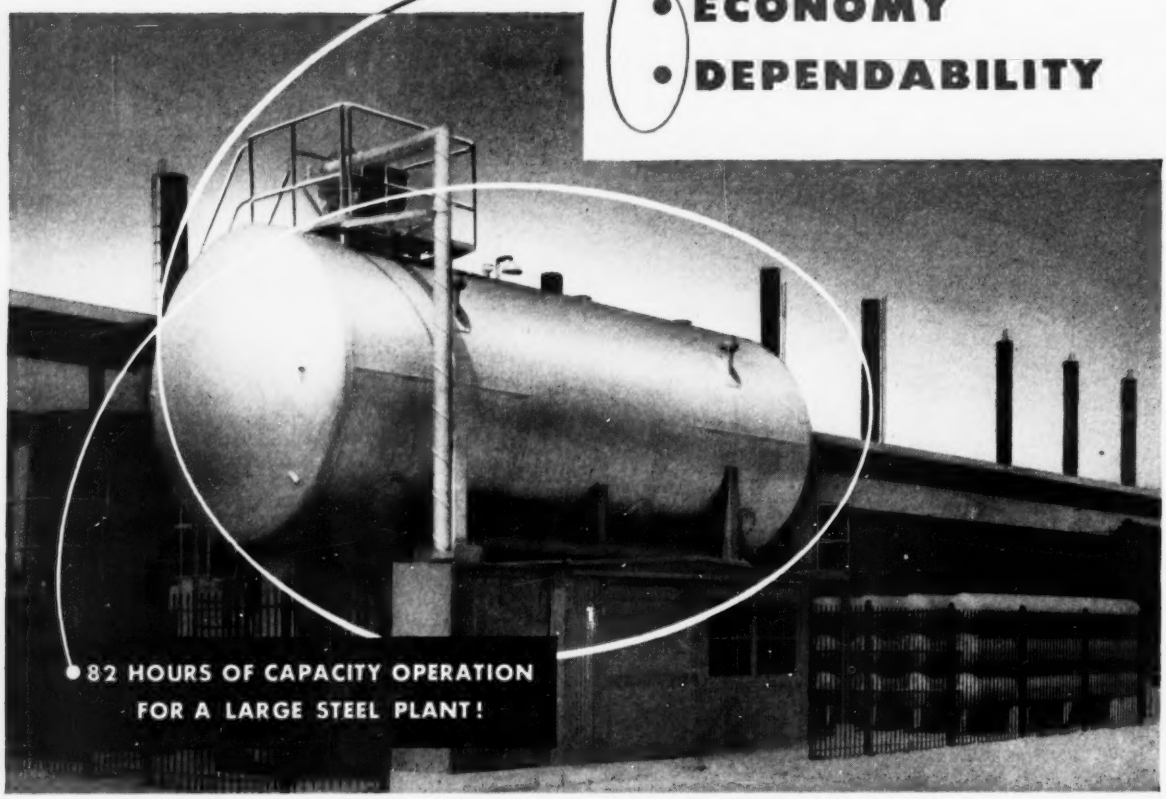
Why LINDE OXYGEN ... plus LINDE SERVICE*

are your assurance of

- EFFICIENCY
- ECONOMY
- DEPENDABILITY



DRIOX liquid oxygen storage units such as this hold as much as 12,250 oxygen cylinders—enough for 82 hours of capacity operation of a large steel plant.

DEPENDABLE OXYGEN SUPPLY:

LINDE's many plants are strategically located to assure dependable supply to meet every need. There can be no oxygen shortage or delay due to failure of a single plant.

LINDE's DRIOX and CASCADE Oxygen Systems have no fixed capacities. Even under widely fluctuating demands, your supply is determined by your needs. You pay only for what you use.

If your company uses oxygen, LINDE SERVICE *can mean dollar savings to you. Let us tell you more about it.*

* LINDE SERVICE

LINDE SERVICE is the unique combination of research, engineering, and over 40 years of accumulated know-how that is helping LINDE customers save money and improve production in their uses of oxygen and oxy-acetylene processes.

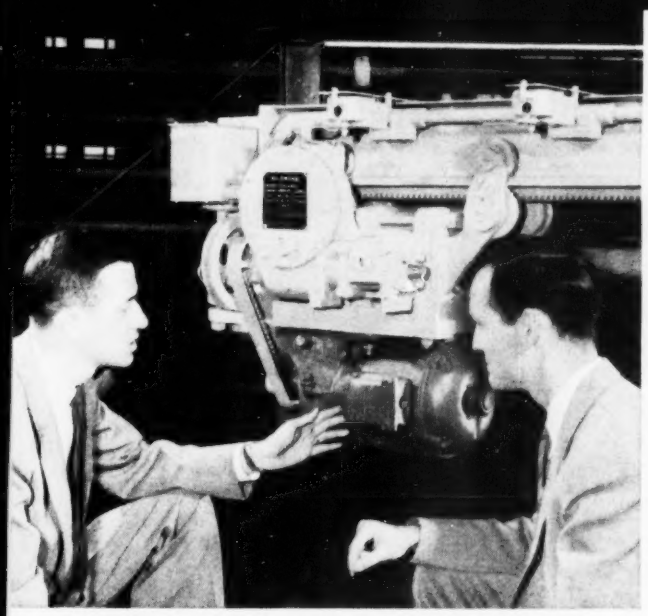
LINDE AIR PRODUCTS COMPANY

A Division of UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street New York 17, N. Y.

Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

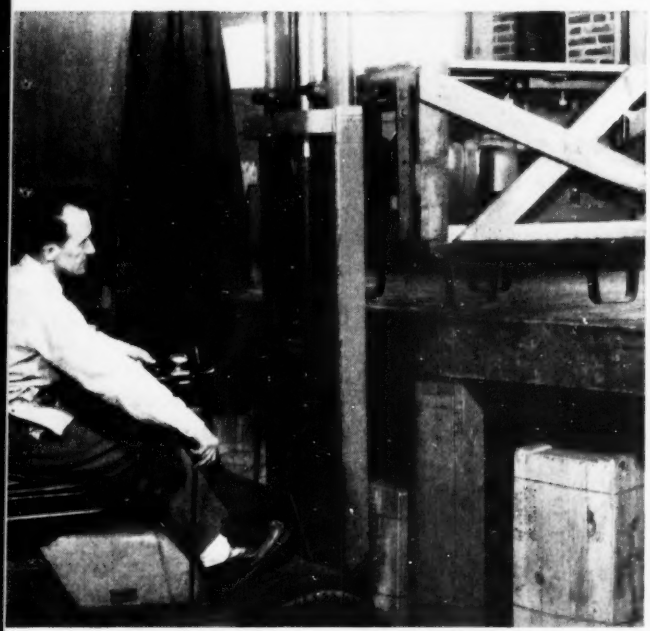


1 QUICK INSTALLATION SAVES YOU MANHOURS when G-E gear-motor is used on compact machines like this soot blower for power plant equipment. Neat, packaged construction permits quick, easy installation in limited space.

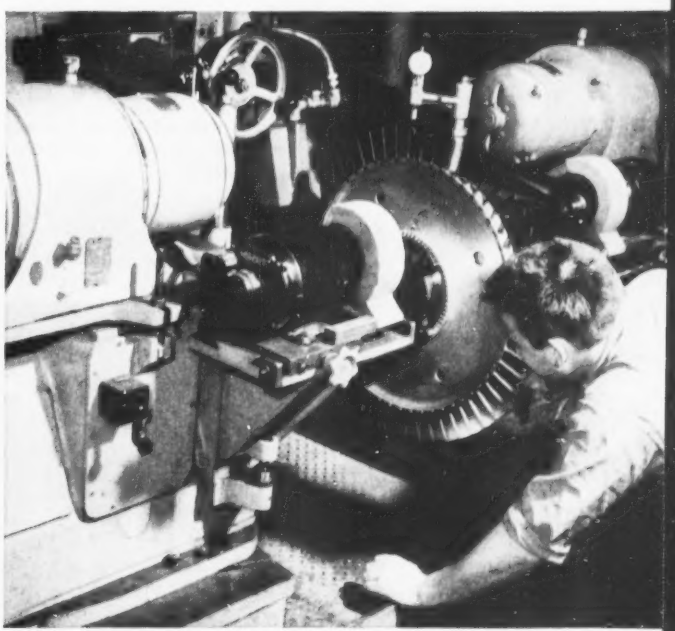
2 SIMPLE MAINTENANCE SAVES YOU MONEY. If electrical maintenance is ever needed on this G-E Tri-Clad gear-motor—driving scraper in a grannery—3-piece design will permit stator removal without disturbing gear train.

Save 4 Ways with G-E TRI/CLAD Gear-motors

REG. U.S. PAT. OFF.



3 PROMPT DELIVERY SAVES YOU TIME—assures you of getting the gear-motor you need when you need it. A new multiple point stock plan permits one-week delivery on more than 300 models of General Electric gear-motors.



4 THE "RIGHT" GEAR-MOTOR SAVES YOU TROUBLE on precision operations like grinding jet engine bucket blades. General Electric's wide selection assures you of the correct gear-motor for your particular low-speed application.

For more information about G-E Tri-Clad gear-motors contact your nearest G-E representative, agent, or distributor, or write to General Electric Company, Section 755-12, Schenectady 5, N. Y. for your free copy of new Bulletin GEA-1437H.

GENERAL ELECTRIC

1½"-18 Flat Head Silicon Bronze Wood Screw. One of 7,000 Stock Items.

end corrosion with HARPER everlasting fastenings

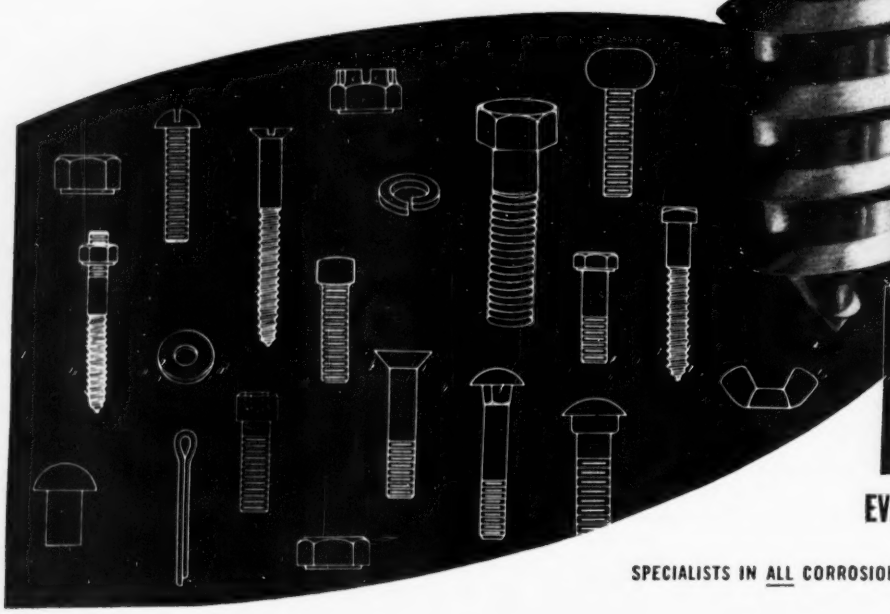
From the day the equipment you manufacture leaves your plant, corrosion begins its work of destruction. It may be slow if atmospheric conditions alone are encountered, or rapid if salt spray, caustic chemicals or acids affect its operation.

Many manufacturers find that the small additional cost of corrosion-resistant fastenings is good insurance on their equipment. Fastenings of brass, silicon bronze, naval bronze, copper, nickel, aluminum, Monel or stainless steel last longer —prevent breakdown—improve appearance and salability.

The H. M. Harper Company is the largest manufacturer specializing in fastenings of corrosion-resistant metals. Over 7,000 items are carried in stock—one order to write—one account to keep—one bill to pay.

There is a Harper Branch office or Distributor near you with stocks ready to fill your order. Consult with Harper metallurgists and engineers on any tough corrosion problem you may be facing.

THE H. M. HARPER COMPANY
8207 Lehigh Avenue, Morton Grove, Illinois



BRASS
NAVAL BRONZE
SILICON BRONZE
MONEL
NICKEL
ALUMINUM
COPPER
STAINLESS STEEL

HARPER

EVERLASTING FASTENINGS

SPECIALISTS IN ALL CORROSION-RESISTANT FASTENINGS

The SURFINDICATOR *weighs only 15 pounds and can be set up anywhere in the plant where 115 volts a. c. is available. Completely self-contained.*

Manufactured under patent license from General Motors Corporation

NEW... the BRUSH SURFINDICATOR*

a practical shop tool for measuring SURFACE ROUGHNESS

WITH THIS NEW, portable inspection tool you can make surface roughness measurements on the production line. The operator merely guides the pickup over the piece to be inspected and then reads surface roughness in average microinches on the meter.

The SURFINDICATOR is *always reliable* because the unit is equipped with a set of Precision Reference Specimens. These permit checking accuracy of the instrument at any time and provide a set of standards for absolute calibration. Using SURFINDICATORS, several plants in different locations can all produce parts to the same surface roughness specifications. Get the complete story on the SURFINDICATOR now!

*Trade Mark

MAIL COUPON FOR BULLETIN . . . OR ASK YOUR BRUSH REPRESENTATIVE FOR DEMONSTRATION!

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2. **NEW YORK 13, New York**
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4. **WASHINGTON 9, D. C.**
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Please send bulletin on the SURFINDICATOR.

Your name .....
Company .....
Position .....
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City ..... State .....

BRUSH ELECTRONICS COMPANY

formerly
The Brush Development Co.
Brush Electronics Company
is an operating unit of
Clevite Corporation.

INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZO-ELECTRIC MATERIALS • ACOUSTIC DEVICES
MAGNETIC RECORDING EQUIPMENT
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spiral
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A complete line of Flights and Accessories for new and replacement service. A compact conveyor — no return strand — can be made dust-tight.
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THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

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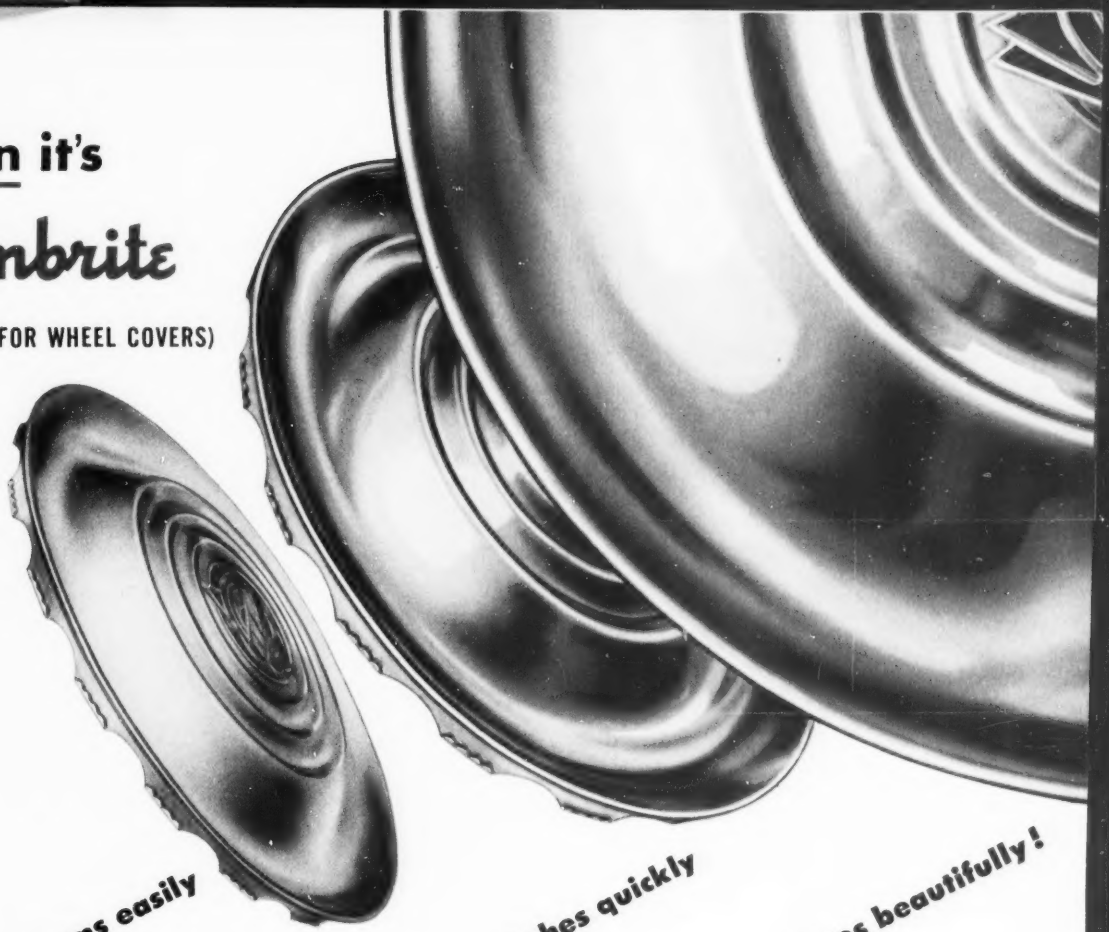
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

again it's Formbrite

(THIS TIME FOR WHEEL COVERS)



● it forms easily ● polishes quickly ● plates beautifully!

Canadian Motor Lamp Co., Limited, Ford, Ontario, is a large automotive parts supplier. When Canada's "Big Three" turned to full wheel covers in place of hub caps for many '53 models this supplier, suddenly facing a new set of production problems, turned to Formbrite*, exceptionally fine-grain Anaconda Brass. Here are the reasons:

1 Previous experience in manufacturing large quantities of chromium-plated brass hub caps made of Formbrite indicated that polishing operations could be reduced as much as 50%.

2 Formbrite had demonstrated its remarkable ductility for press operations—taking sharp, clean-cut, ornamental die impressions.

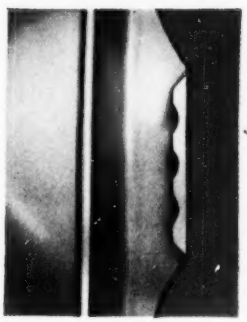
3 Formbrite was harder, stronger, springier and more scratch-resistant than ordinary drawing brass . . . desirable characteristics for the service involved.

4 Important, too, was the fact that Formbrite would provide the fatigue-resisting springiness to the gripping fingers that hold the cover to the wheel.

Now in full production on the new wheel covers, Canadian Motor Lamp's appraisals proved 100% correct. Maybe *you're* missing something by *not* using Formbrite. Write for Publication B-39, addressing The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

*Reg. U. S. Pat. Off.

5350

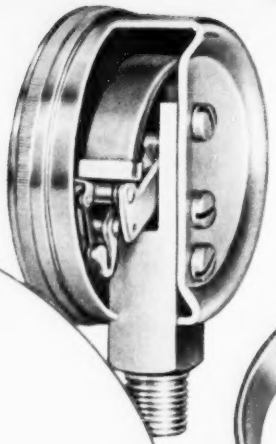


Shown above is one of the 16 sets of gripping fingers which hold the 15" diameter wheel cover to the rim. The metal is yellow brass, .024" thick, supplied in coil as Formbrite.

Formbrite DRAWING BRASS

An **ANACONDA** product made by The American Brass Company

PRESSURE



It's big business at U.S. Gauge where **brass belongs**

At Sellersville, Pa., millions of pressure gauges are made each year—for every type of industry—to every degree of accuracy—and for pressures ranging from a few ounces per square inch up to 100,000 pounds.

With each gauge a precision instrument unto itself, it's quite a job to maintain the high standards of routine fabricating procedure on each of its many components. Part of it depends on having just the right copper alloy in the most satisfactory combination of chemical and physical properties. That's where teamwork between U. S. Gauge and Anaconda Metals has been clicking day after day, year after year.

and now—something NEW has been added . . .

U. S. Gauge is now using Formbrite* for many of its "polished and lacquered" and chromium plated solid brass gauge cases. Formbrite, with its superfine grain, provides a surface far superior to ordinary drawing brass. It is stronger, harder, more scratch-resistant than ordinary brass, yet retains remarkable ductility for forming and drawing. Best of all, Formbrite is a real time saver when it comes to finishing operations.

Want to know more about this "premium product at a non-premium price"? Write for Anaconda Publication B-39. Address: The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. *Reg. U. S. Pat. Off.

Formbrite DRAWING BRASS

An **ANACONDA** Product

Made by The American Brass Company

Gauge and components courtesy of

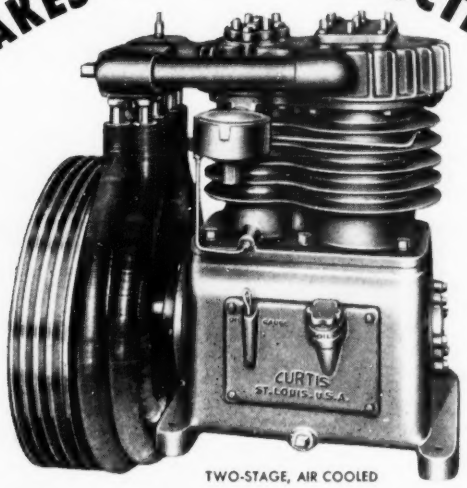
UNITED STATES GAUGE

DIVISION OF AMERICAN MACHINE AND METALS, INC.

Sellersville, Pa.

For the ultimate in precision, eleven different Anaconda Alloys in the form of rod, tube, sheet and strip are used in producing the components of the U. S. Gauge illustrated above.

Dependable, Efficient
Curtis AIR COMPRESSORS
AIR HOISTS
AIR CYLINDERS
MAKES YOUR PRODUCTION MORE PROFITABLE

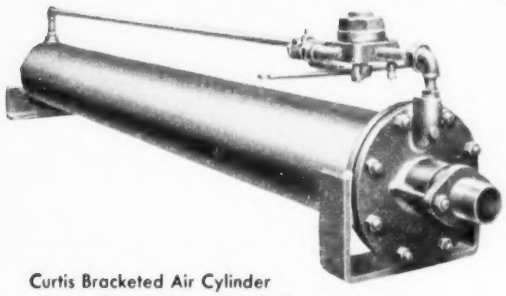


TWO-STAGE, AIR COOLED

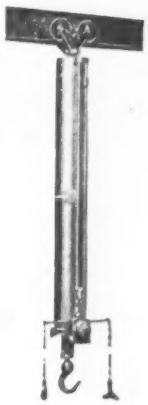
PRECISION BUILT COMPRESSORS UP TO 50 H.P.

- Advanced two-stage design saves electric current.
- Delivers more air per horsepower.
- Timken tapered main bearings.
- Pressure lubricated rod and piston bearings.
- Assures long trouble-free performance.

TIME-SAVING Curtis Air Cylinders and Air Hoists


Curtis Bracketed Air Cylinder can be placed in any position from horizontal to vertical. Will lift, lower, push or pull.

- Low-Cost lifting, lowering, pushing, or pulling
- Accurately controlled operating speed
- Cylinders are ground and polished
- Valve is of disc type lapped to its seat.


Curtis Pendant Air Hoist for any lifting or lowering job where headroom is not limited.

FOR COMPLETE INFORMATION and technical data, mail this coupon today . . .

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1996 Kienlen Avenue, St. Louis 20, Mo.
99 Years of Successful Manufacturing Experience

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I am interested in items checked below:

☐ AIR COMPRESSORS ☐ AIR HOISTS ☐ AIR CYLINDERS

Capacity . . . Current . . . Load . . . Lift . . . Load . . . . . Lift . . . . .

Name . . . . . .

Firm . . . . . .

Street . . . . . .

City . . . . . Zone . . . . State . . . . . .

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Strapped shipping cartons pass Maytag Co. torture tests

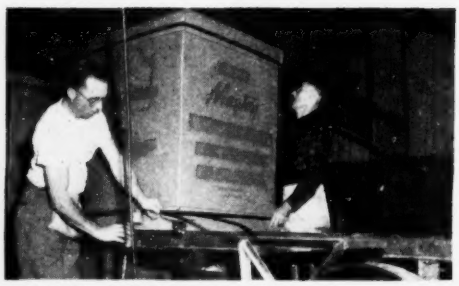
BOUNCED AND BATTERED. Acme Steel Strapping holds securely as fibreboard shipping carton is vibrated and then butted on each side and bottom in Maytag Company "torture chamber."

The Maytag Company of Newton, Iowa, insures S.A. (Safe Arrival) of all its automatic washers by using Acme Steel Strapping both to seal fibreboard shipping cartons, and then to anchor those cartons securely in freight cars.

The strapped carton method was adopted only after torture tests proved it superior to other methods.

An added advantage is that packing the Maytag Automatic with Acme Steel Strapping takes less than half as much manpower as a similar Maytag operation employing previous packing methods.

If you have a packaging problem, chances are Acme Steel Strapping or Acme Steel Stitching Wire methods can provide just the solution you need. Telephone your Acme Steel representative, or write Acme Steel Products Div., Dept. S73, Acme Steel Company, 2840 Archer Ave., Chicago 8, Illinois.



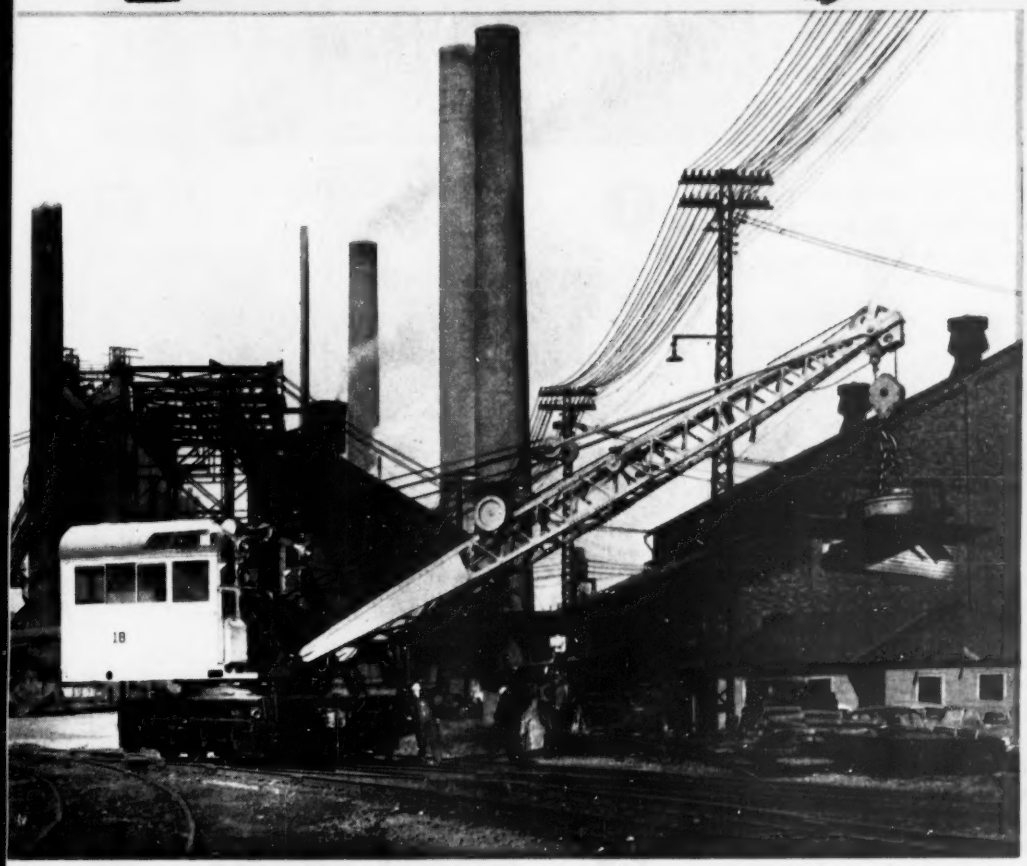
MINIMUM MANPOWER. Top and bottom caps on carton containing Maytag automatic washer are each secured by one turn of $\frac{5}{8}$-in. Acme Steel Strapping. Straps are tensioned by push-button operated Acme Steel pneumatic stretcher.

FINAL STEP. After strapped cartons move speedily and safely through packaging department, they are loaded into freight cars and quickly anchored with Acme Steel Strapping.

ACME STEEL

STRAP IT . . . STITCH IT . . . SHIP IT . . . SAFELY!

This BROWNING 30-Ton Diesel-powered locomotive crane with 55-inch magnet, is one of ten Brownings on the job at a large midwestern steel plant. This company uses Brownings for all crane operations—ore and scrap handling, coal loading, car switching and maintenance work.



Browning builds the only complete line of heavy-materials handling cranes

● If it's crane work there's a Browning built to do it . . . efficiently, economically and dependably. That's because Browning models are designed to do specific jobs for specific industries—and they're built to *stay on the job.*

Browning's half-century of specialized experience devoted exclusively to crane manufacturing, and Browning's well-known rugged design and construction are your best assurance that *you can't go wrong with a Browning on the job.*

Write for complete specifications on the Browning model designed for your job.

WAGON CRANES
2 Models
17½ to 25 Tons
25 to 100 Ft.
Booms

TRUCK CRANES
5 Models
8 to 30 Tons
25 to 120 Ft.
Booms

LOCOMOTIVE CRANES
3 Models
25 to 50 Tons
50 to 135 Ft.
Booms

You can't beat* BROWNINGS *on these jobs

PILE DRIVING

STOCK PILING MATERIALS

BRIDGE CONSTRUCTION

HEAVY FREIGHT HANDLING

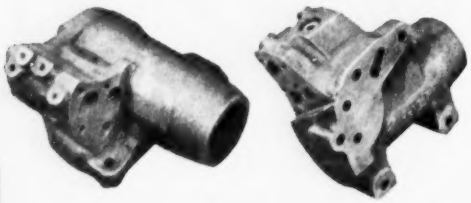
THE BROWNING CRANE & SHOVEL CO.
Dept. J • 16226 Waterloo Road • Cleveland 10, Ohio

BROWNING
LOCOMOTIVE, WAGON
TRUCK AND CRAWLER *Cranes*

TRACTOR ENGINE PLANT

Speeds-Up Production with...

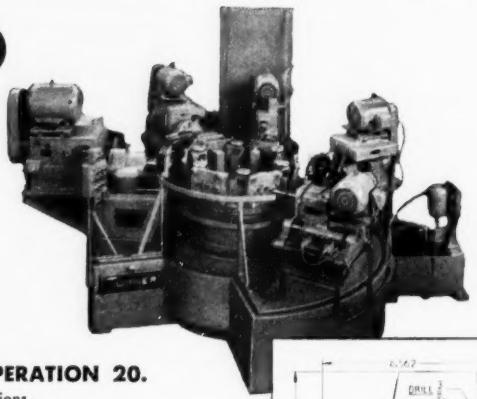
Five Turner special purpose machines perform *55 operations* to produce 80 hydraulic lift cylinders per hour at 80% efficiency per machine.*



In designing and building these special automatic indexing-type machines, Turner has solved a difficult problem of producing hydraulic lift cylinders at high speed, with maximum efficiency, yet at a low manufacturing cost. It was done by employing time and money-saving Turner manufacturing methods. For example, on Operation 90, Turner designed multiple spindle heads are used for drilling, reaming, counterboring, chamfering, spot-facing and tapping. Two castings in each fixture are machined at the same time in a two cycle operation, so that at the end of the first two cycles, a finished machined part comes off the table with each cycle thereafter. Where deep holes are needed, there is no time lag taken up by repeated passes of the drill. The work piece is indexed to a second and third station for completing deep drilling and equalizing the other operations. It insures uninterrupted machining at all stations at the same time. Follow the five illustrations for detailed sequence of operation of each machine.

Turner solves high production problems such as this by first studying the problem thoroughly, applying years of technical experience; then, by designing fixtures and spindle heads *exactly suited to your job.* With all of the Turner special purpose machines, standard bases and columns are used. This keeps manufacturing costs at a minimum. It means you are assured a machine specially designed for your application, yet without the high extra costs you might expect.

1



OPERATION 20.

Stations

No. 1 Load and Unload

No. 2 Drill (5) 3/8 hole

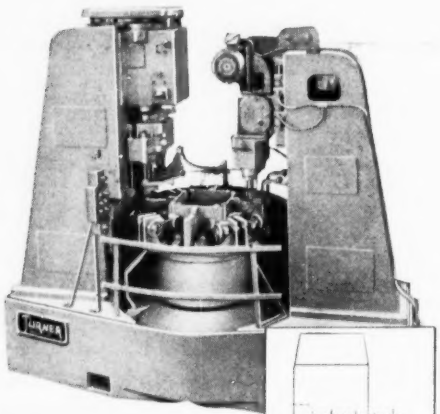
No. 3 Ream (5) 25/64 holes

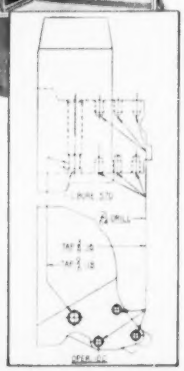
No. 4 End Drill .54 diameter x .28 counterbore

No. 5 Drill (1) 21/64 hole 1/4 deep for counterbore

No. 6 Tap 1/8 x 27 pipe thread

4





OPERATION 100.

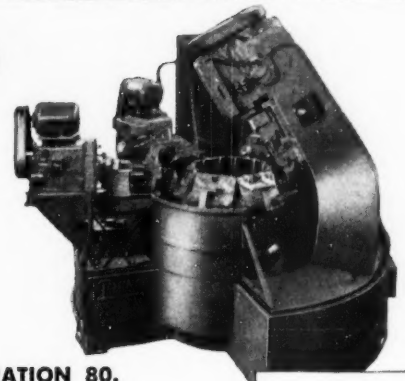
Stations

No. 1 Load and unload and transfer to other side of fixture.

No. 2 Tap drill (6) 3/8 x 16 holes. Combination ream 1/2 diameter and counterbore .565-.570 x .09 deep.

No. 3 Tap (6) 3/8 x 16 holes and (1) 5/16 x 18 hole.

TURNER Special Automatic Indexing-Type Machines!



OPERATION 80.

Stations

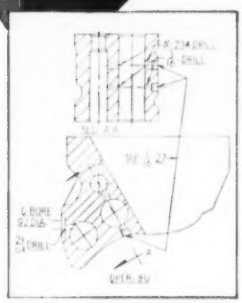
No. 1 Unload and transfer to other side of fixture

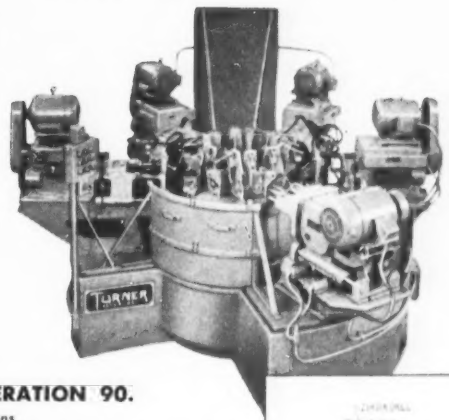
No. 2 Drill (1) "A" diameter hole through into 1.0002 bore, Step Drill (1) "A" diameter tap hole and 3/16 diameter into 1.0002 bore.

No. 3 Drill (1) "A" and (1) 3/16 diameter into .6865 hole.

No. 4 Tap (2) 1/16 x 27 dryseal pipe tap

No. 5 Drill 21/64 diameter x .75 deep and counterbore .92 diameter x .72 deep.





OPERATION 90.

Stations

No. 1 Unload and transfer to other side of fixture.

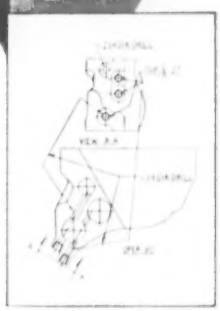
No. 2 Drill (4) .234 holes at bottom of (4) 1" holes through plug guide bushings.

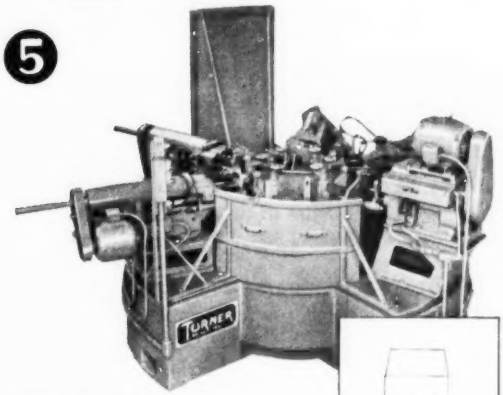
No. 3 Spot face (4) 3/16 x .234 dia.

No. 4 Drill (4) .234 holes.

No. 5 Drill (1) .234 hole into .6873 hole.

No. 6 Tap 1/16 x 27 pipe tap (3) holes.





OPERATION 110.

Stations

No. 1 Load and Unload

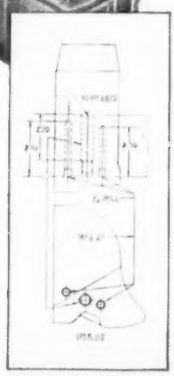
No. 2 Drill .234 diameter hole first step and drill 21/64 diameter hole first step.

No. 3 Drill .234 diameter hole and 21/64 diameter hole second step.

No. 4 Finish drill .234 and 21/64 holes.

No. 5 Tap 1/8" pipe tap and tap 1/16" pipe tap.

No. 6 Ream .6865-.6873 diameter.



You'll find other Turner special purpose machines designed to meet difficult assembling and testing jobs, too; or, wherever special hydraulic presses, impregnating and flushing machines are needed to perform a tough job in the shortest possible time. Turner special automatic indexing-type machines are available from 2 to 36 stations in diameters up to 12 feet.

**The June issue of MACHINERY carries the complete tractor engine plant story. Reprints are available upon request from Turner Bros., Inc.*

If you have a production assembly or inspection problem where you can use to advantage a special purpose machine, write today describing your problem. After our engineering department analyzes it, our field engineer will discuss it with you.

TURNER BROS. INC.

2625 HILTON ROAD
FERNDALE 20, MICHIGAN

DESIGNERS and BUILDERS of:

- SPECIAL MACHINES
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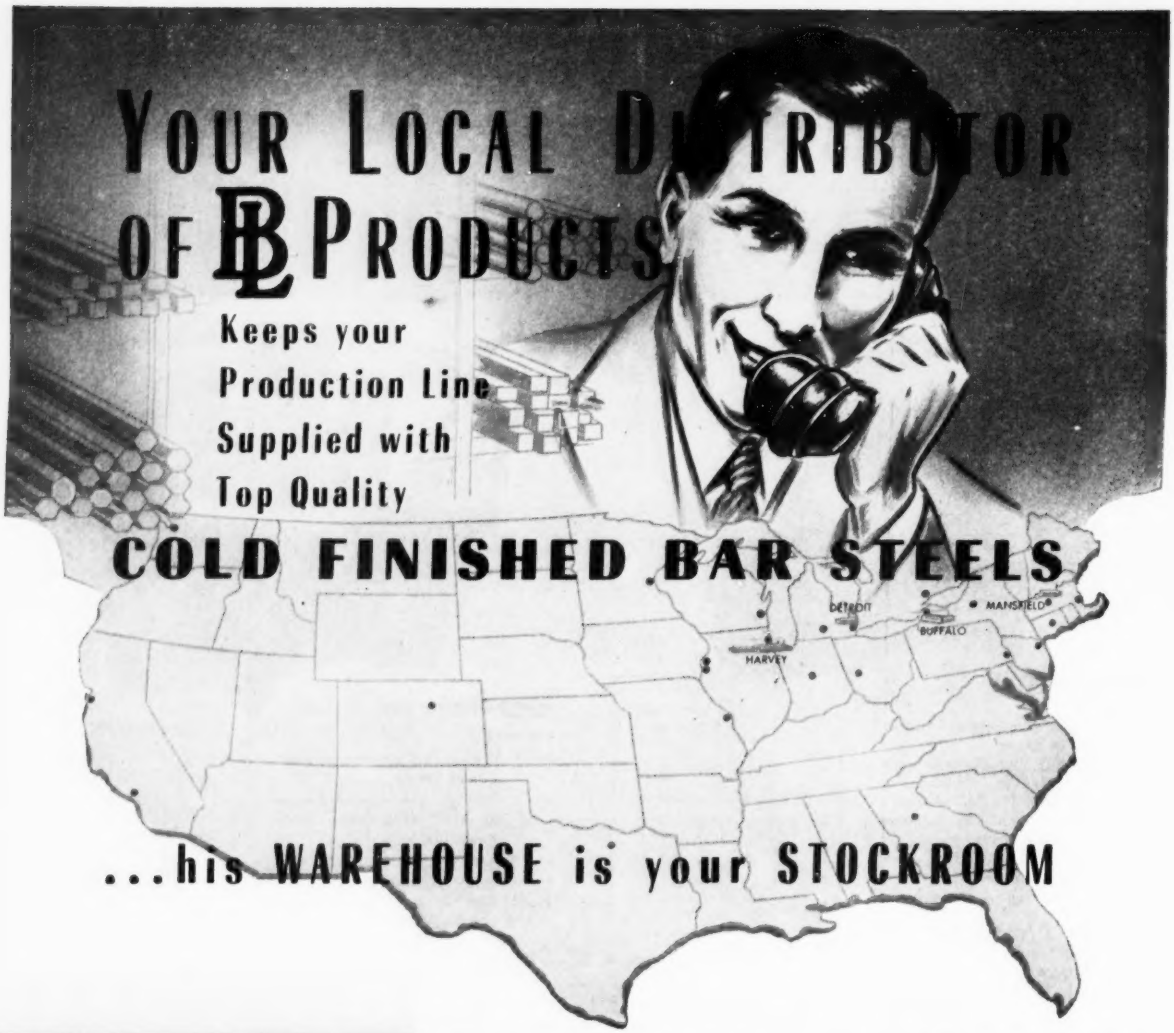

NATION-WIDE DISTRIBUTION of B & L Products

assured by Local Distributors from coast to coast with convenient Warehouse Stocks of B&L Cold Finished Bar Steels

B&L Service is backed by 4 Modern Steel Plants and 25 District Sales Offices in Principal Cities

Here is a good business tip for smart buyers of Bar Steels: Order your immediate requirements direct from the nearest Local Distributor of B&L Products. You can get *what* you want, *when* you want it . . . a few bars or a truck load . . . in odd lots or scheduled deliveries, timed to meet your production needs. You don't have to tie up your capital in heavy inventories to be assured of a steady supply of B&L prime quality Cold Finished Bar Steel and Shafting.

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Write us for names of Local Distributors of B&L Products in your area

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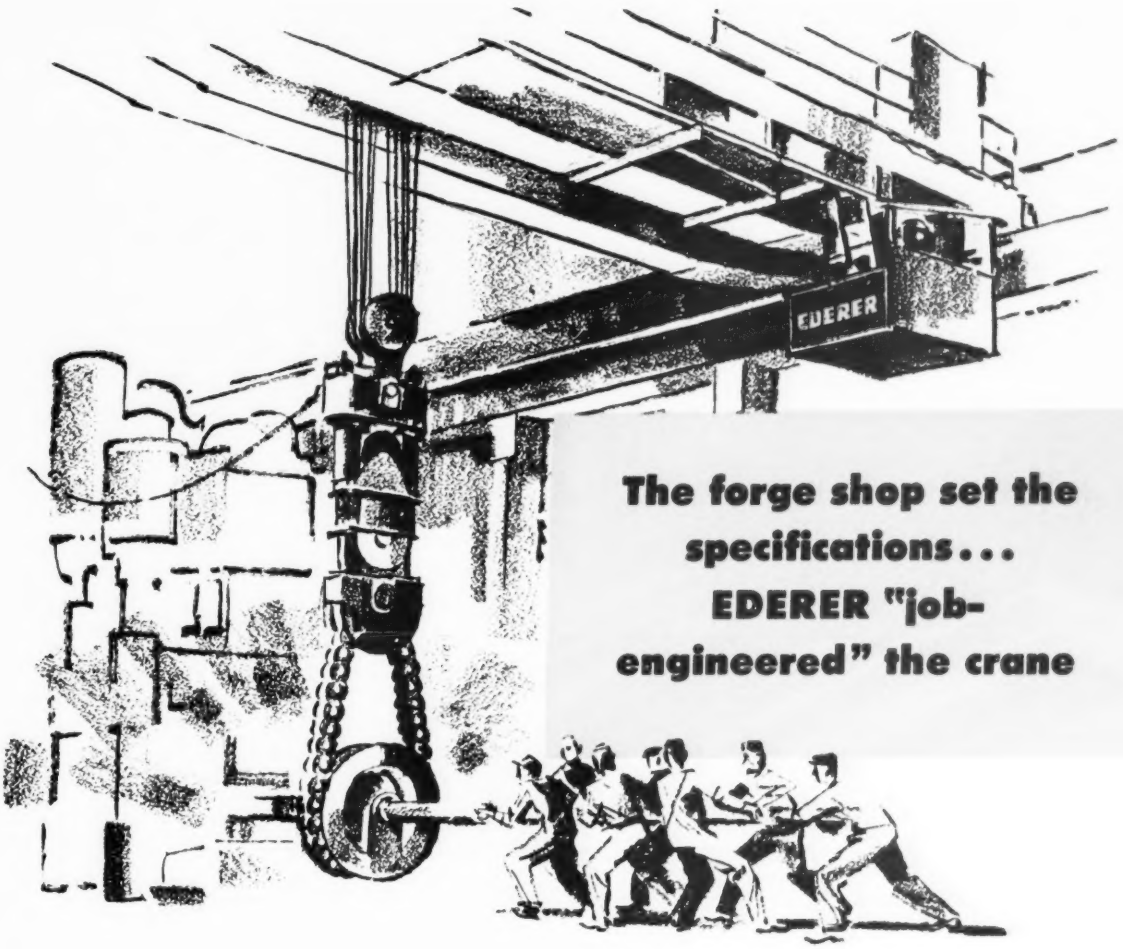
***FOUR PLANTS:* HARVEY, ILL. • DETROIT, MICH. • BUFFALO, N. Y. • MANSFIELD, MASS.**

B&L SINCE 1891



The forge shop set the specifications... EDERER "job-engineered" the crane

Requirements for a crane to serve a 1500-ton steam press are exacting. EDERER "job-engineered" this 50-ton crane to those requirements for a large fabricator of heavy steel equipment and forgings. It has been in continuous service for the past nine years—handling some of the heaviest forgings made in the West.

Whatever your industry, you have *your* particular materials handling requirements. EDERER—one of the largest crane manufacturers in the West—can "job-engineer" a crane to meet them—whether for plant expansion or new construction.

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CRANES

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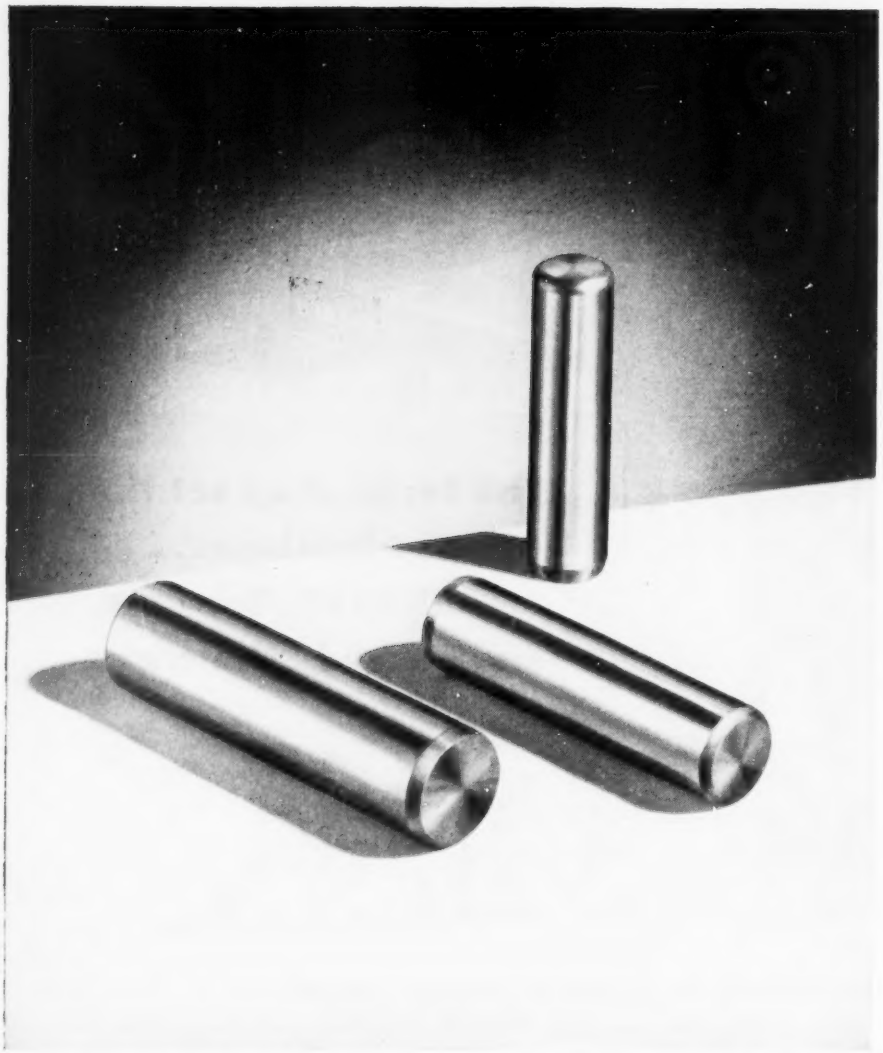
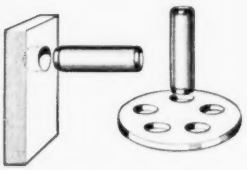


UNBRAKO PRECISION-GROUND ALLOY STEEL DOWEL PINS feature the following: formed ends which won't chip; 60-62 Rockwell "C" Scale surface hardness; 6 micro-inch maximum surface finish; 50-54 Rockwell "C" Scale core hardness; 150,000 psi average single shear strength; ± 0.0001" diameter tolerance; 2 standards—blue label pins, .0002" oversize for nominal press fit requirements and red label pins, .001" oversize for use as repair pins.

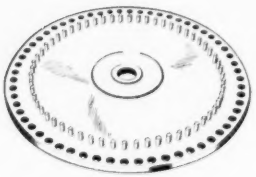
Our Fiftieth Year

A START FOR THE FUTURE



Use UNBRAKO Dowel Pins as plug gages in various production operations, as guide pins, as stops, as wrist pins, hinges and shafts.

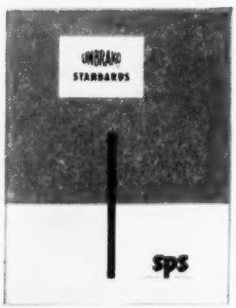
As fasteners for laminated sections, machine parts. As roller bearings in casters, truck wheels, etc.



As position locators on indexing machines, for aligning parts, as feeler gages in assembly work, cs valves and valve plungers on hydraulic equipment.

See your distributor for UNBRAKO standards

You save time and money ordering UNBRAKO socket screw products from your UNBRAKO industrial distributor. He has a complete stock, offers excellent service and prompt deliveries. Write for UNBRAKO Standards. STANDARD PRESSED STEEL CO., Jenkintown 32, Pa.



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UNBRAKO® SOCKET SCREW DIVISION

sps JENKINTOWN PENNSYLVANIA

We'll build you a complete artillery shell forging plant and hand you the key

Salem-Brosius possesses a unique background of experience in the design and fabrication of shell forging plants which dates back well before World War II, and makes this organization the ideal source for such facilities. We are equipped to assume the entire contract, or any segment thereof. Salem-Brosius lays claim to being highly skilled in the design and construction of plants incorporating heating furnaces, descalers, preform presses, shell-forming mills, brooder furnaces, quench tanks, materials handling equipment, and all the hydraulic, pneumatic, electrical, and fuel systems and controls necessary to efficient and economical operation. If you are considering entry into the rapidly expanding business of producing ammunition to insure our country's safety, or contemplating expansion of your current operation, it will pay you to contact us. We'll build the complete plant and hand you the key or help you with any part of the problem. Write, wire or phone.

SALEM-BROSIUS, INC.

Sales and Executive Offices: 248 Fourth Avenue, Pittsburgh 22, Pa.

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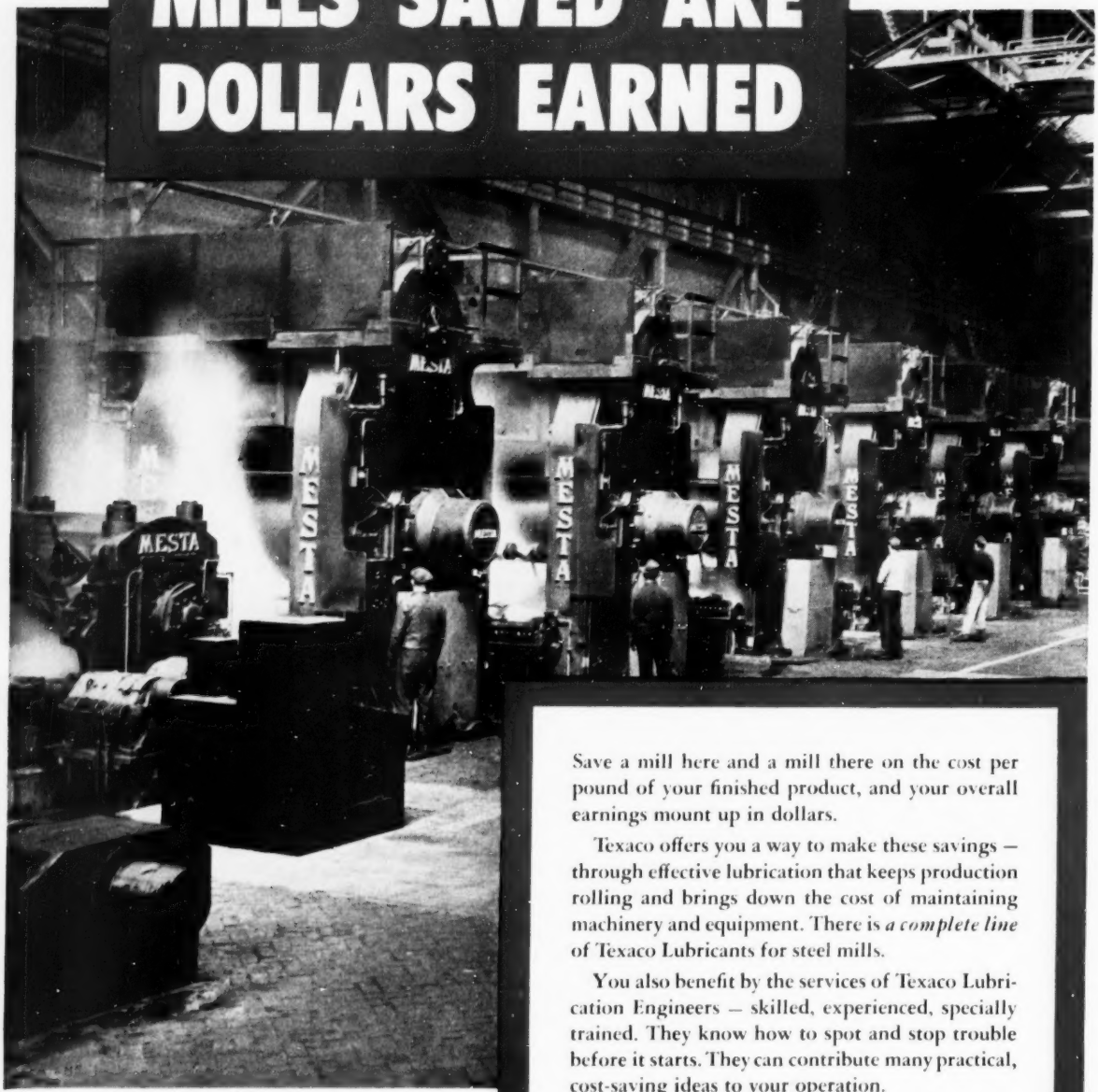
MILLS SAVED ARE DOLLARS EARNED



Save a mill here and a mill there on the cost per pound of your finished product, and your overall earnings mount up in dollars.

Texaco offers you a way to make these savings — through effective lubrication that keeps production rolling and brings down the cost of maintaining machinery and equipment. There is *a complete line* of Texaco Lubricants for steel mills.

You also benefit by the services of Texaco Lubrication Engineers — skilled, experienced, specially trained. They know how to spot and stop trouble before it starts. They can contribute many practical, cost-saving ideas to your operation.

Put Texaco to work in your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

Metalworking Outlook

Slower Defense Deliveries?

Defense contractors, except aircraft, are in for cutbacks in their contracts generally. Even in aircraft, you can expect some shifting around (p. 57), although total government spending for that purpose will be higher this year than last and will level out at an annual rate of about $10 billion through 1955. In regard to other types of military contracts and to those aircraft deals that don't call for delivery until after 1955, the Defense department says it "will carry out revisions during the next six to eight months to reduce procurement levels . . . In many cases extension of delivery schedules will be the general procedure in bringing about reductions rather than outright contract cancellations."

Renegotiation: Here To Stay

Defense contract renegotiation looks like it's becoming a permanent fixture in the economy. The current renegotiation law expires next Dec. 31, but two separate bills now in the House hopper would extend it—one for one year and the other for two. Renegotiation is certain to be extended for at least 12 months in about the same form it is in now.

Improvement for the Navy

At least one armed service reports improved deliveries and fewer shortages. The Navy says, "Many bottlenecks and shortages of material have eased or disappeared in almost all major programs." It now has outstanding about $5 billion in contracts and orders for defense goods, nearly the same as a year ago. In fiscal 1953 which just ended June 30, the Navy received $6.8 billion in deliveries, compared with $4.6 billion in the previous fiscal year.

Republic Branches Out

Watch Republic Steel Corp. It's setting a pace in diversification which may result in a new trend for the steel industry. The company has moved in on titanium, steel kitchens, plastic pipe, aluminum windows and iron powder, to make the firm far more than just a producer of steel products. The policy is paying off, since sales are averaging $100 million a month thus far this year, compared with about $87.7 million a month in 1951 (1952 is not comparable because of the steel strike).

Cybernetics: What Is It?

"Cybernetics" should play a big role in your future. No, it's not a new vitamin or antibiotic. Cybernetics is basically the science of communication and control that makes use of five human senses in machines. Photoelectric cells see, microphones hear, gas detectors smell, acidity detectors taste and radar is sensitive to touch. By co-ordinating those human factors in machines, we get cybernetics and from that the means to have au-

Technical Outlook—p. 97 The Market Outlook—p. 159

tomatic factories and new productive efficiency. Such heady ideas were some of the things imparted by General Electric Co. personnel to college engineering professors this month as part of a plan to help educators look ahead in their fields.

Some Progress

The intense campaigns to reduce the nation's shortage of engineers "are starting to pay off", says Louis M. Stark, manager of Westinghouse Electric Corp.'s school service department. In 1951 some 40,000 freshmen enrolled in engineering and that group will produce about 22,000 graduates in 1955. In 1952 the enrollment of first-year engineering students rose to about 52,000, justifying an estimate of 29,000 graduates in 1956.

Korean Vets: 2000 Return a Day

One help for the shortage of engineers and other manpower has been the return of Korean veterans to civilian life. They're coming back at a rate of more than 2000 a day. That flow helps the economy, too, because many of those men are ready to buy homes, appliances and cars. There are now about 16.5 million Korean and World War II veterans. Only some 3 million have thus far used their GI home-buying rights.

Giant Machine for Thompson

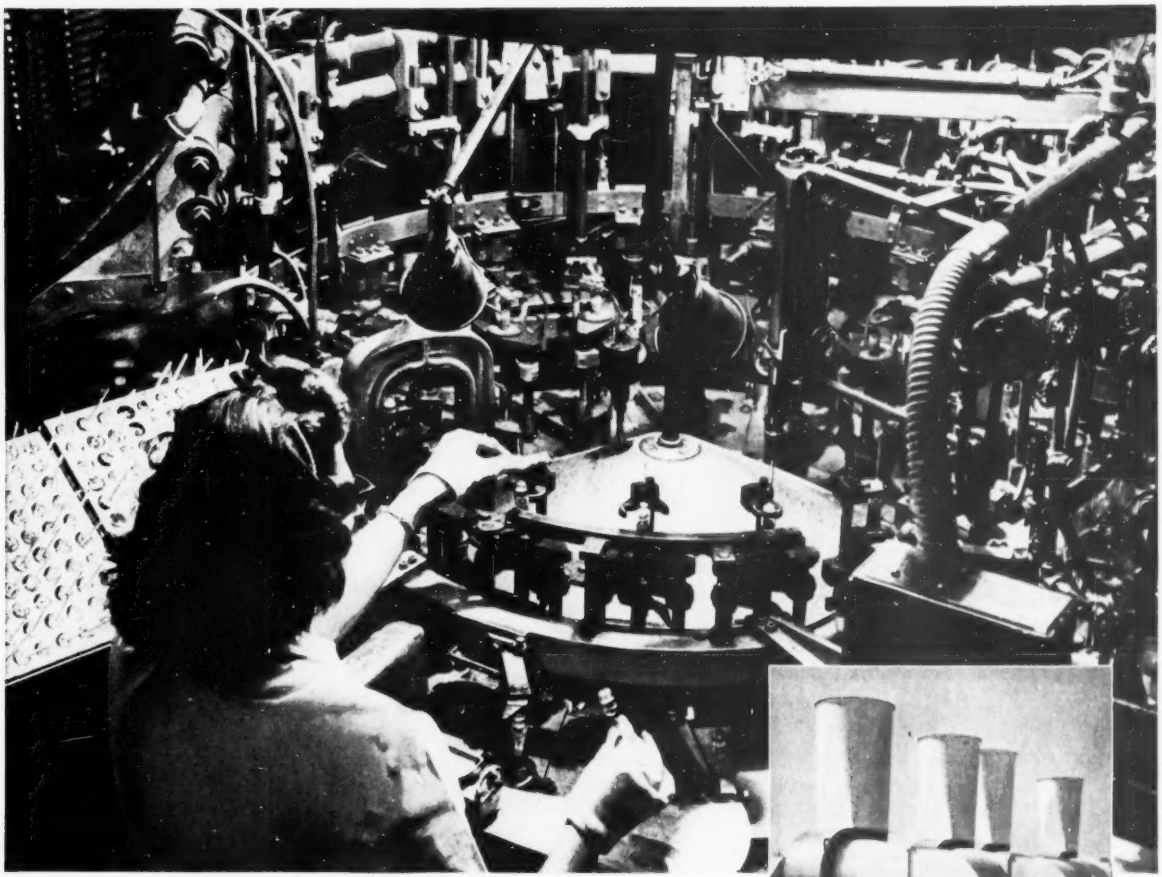
A giant device to machine jet stator housings will be shipped to Thompson Products Inc. in Cleveland late this month. Just two of those machines reportedly could machine all the stator housings needed by the entire aircraft industry. The device was designed by Hautau Engineering Co. and built by Acme Engineering Co., both of Detroit. An indication of the size of the unit is the fact that a 60 horsepower motor is required to drive just the cooling pump on it and that a special conveyor system is needed merely to take care of the chips.

Straws in the Wind

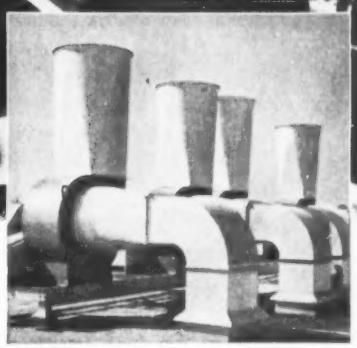
Bethlehem Steel Co. has been awarded a certificate of necessity which will permit it to write off in five years half of a $30 million expansion to produce more wide flange structural shapes . . . Look for White Motor Co., Cleveland, to acquire another truck and bus producer, Autocar Co., Ardmore, Pa., by Sept. 1 . . . General Electric Co. raises the retail price of five refrigerators $10 to $20 on July 13 . . . It's virtually certain that there will be no changes in the Taft-Hartley Act this year.

What Industry Is Doing

The aircraft industry will do a $12 billion business in 1953, best since 1945 (p. 57) . . . Eastern steel buyers are restudying freight rates as U.S. Steel Corp.'s new Fairless Works begins production (p. 58) . . . Green River Steel Corp. has begun electric furnace steel output at Owensboro, Ky. (p. 59) . . . Although the "peak" in capital expenditures is supposed to be past, capital goods producers will spend 6 per cent more this year than last on new plant and equipment (p. 60) . . . Sales of vending machines should hit $1.75 billion in 1953, compared with about 1.5 billion in 1952 (p. 61) . . . Nearly 20 per cent of the 85 million tons of finished steel to be produced this year will be distributed through warehouses (p. 67).



Putting Air to Work for RCA: Special machines for mass production each create 112,750 BTU's, cause special problems.



Ten Westinghouse fans exhaust the intense heat caused by flame jets and induction heating. This highly efficient Silentvane® fan does the job well, requires little maintenance.

Installed by Kirk & Blum Manufacturing Co., Cincinnati. Consulting Engineer: Paul P. Kopf, Philadelphia.

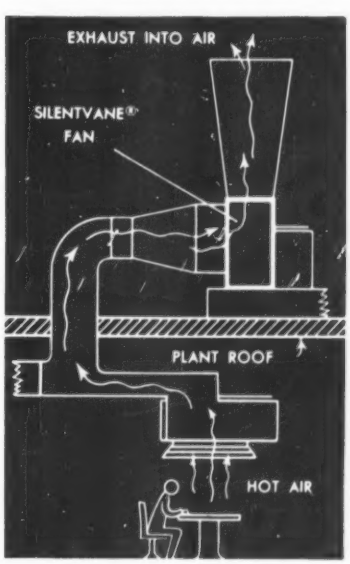
2,900,000 BTU EXHAUSTED

—OPERATORS STAY AT PEAK EFFICIENCY

Turning out miniature electron tubes is a hot business at RCA. Using a gas flame and induction heating, the process develops 2,931,200 BTU every hour. Exhausting this heat permits operators to work at peak efficiency.

Dependable Westinghouse fans handle the heat removal. They're rugged, can easily take the intense heat. And they do it quietly, efficiently.

If *you* have a heat exhausting requirement, or need ventilation for any purpose, let us help you. Westinghouse makes the most complete line of air handling, air conditioning and electronic air cleaning products available. Call your Westinghouse-Sturtevant office, or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

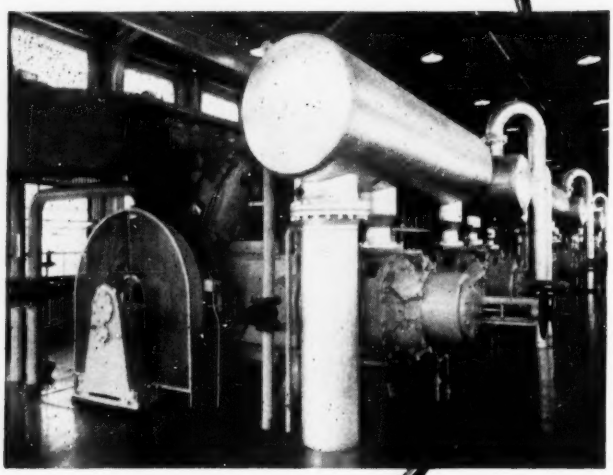


WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

J-80297

ARMCO 17-4 PH Helps Deliver The Gas



This large hoop is a vital part of a large gas compressor. As a piston ring expander it must exert continuous pressure on the piston ring. The ring is made of Armco 17-4 PH, a new precipitation-hardening stainless steel.

HARDENED WITHOUT DISTORTION

Armco 17-4 PH requires only a single low-temperature heat treatment at 850-900 degrees F. There is no distortion, cracking or scaling—only a light heat tint. Yet the heat treatment develops a minimum tensile strength of 180,000 psi and minimum yield strength of 165,000 psi.

TWO PRECIPITATION-HARDENING GRADES

Armco 17-4 PH is produced in bars and wire. Another precipitation-hardening stainless steel, made in sheets, strip, plates, bars and wire, is known as Armco 17-7 PH. Depending upon condition, this grade is hardened by a single or double low-temperature heat treatment.

HIGH STRENGTH PLUS CORROSION RESISTANCE

Both precipitation-hardening stainless steels develop yield strengths higher than Types 301, 403, 410, 414, 416 and 431, with equal or higher tensile strengths. Yield strengths in compression are equal to or higher than those in tension. Corrosion resistance of both grades is generally better than that of the standard hardenable types.

If you want the latest information and test data on these remarkable stainless steel grades, write for the bulletin, "Armco Precipitation-Hardening Stainless Steels."

Armco Steel Corporation

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ARMCO

Competition

Several times during the past few months discussion on this page has dealt with the high degree of competition in the American capitalistic system. We have suggested that perhaps one reason why many European industrialists find it difficult to understand our system is that they do not realize the important role which competition plays in it.

In a letter to the editor, a reader who has just returned from France confirms the fact that this misconception of our economic system is prevalent among industrialists on the continent. He reports that at sessions of International Rotary, supposedly well informed Frenchmen stated repeatedly that we in the United States have little or no competition in basic industries such as coal, steel, transportation, etc. Even when confronted with the number of direct competitors in industrial fields in the United States, the foreign industrialists held steadfast to their belief that we have little or no competition.

It is difficult to believe that the attitude of these Europeans is due to stubbornness. Isn't it likely that our French friends, having gained the idea that private enterprise cannot thrive and grow powerful if it is confronted with stiff competition, simply assume that if an American corporation can grow to the size of a General Motors, United States Steel or General Electric, its very growth and success is proof positive that it has not had to contend with competition?

Thus it is quite possible that many misunderstandings not only in Europe but throughout the world in regard to the American competitive capitalistic system arise from an almost instinctive belief that the influence of competition is bad instead of good. Forty years ago many eminent American industrialists viewed competition as a plague. Even today there are a number of corporation executives who have grave doubts as to the value of competition.

What is sorely needed today is a true understanding of what competition can do to advance the well-being of the world. It has been the most important factor in the fabulous development of the distinctive American economy. If given the opportunity, it could perform miracles for other nations.

E. L. Shaner

EDITOR-IN-CHIEF

BEGINS NEW CHAPTER: Speaking of competition, the announcement last week of prices on hot and cold-rolled carbon sheets to be shipped from the new Fairless Works of United States Steel Corp. near Morrisville, Pa. (p. 58), is the beginning of a new chapter in the marketing of steel on the eastern seaboard.

For many years, Bethlehem Steel, with facilities at Sparrows Point, Md.; Bethlehem, Steelton and other points in Pennsylvania; and

at Lackawanna in suburban Buffalo, had a distinct advantage in eastern markets. A number of smaller producers in eastern Pennsylvania, Delaware and New England also catered to the eastern trade.

Now comes U. S. Steel with quotations $2 per ton over Bethlehem's quotations for delivery from Sparrows Point. In spite of this $2 handicap, U. S. Steel will hold an advantage in the Philadelphia market and in some other steel consuming areas because of freight rate technicalities.

It will be interesting to watch the development of a completely new price pattern in the eastern steel market. It is a timely exhibit in the important role of competition that we have been discussing.

* * *

PROMOTES EFFICIENCY: Again harping on competition, we are impressed by the lead story in Floyd Lawrence's "Mirrors of Motordom" (p. 71), which explains how exhaustive tests conducted on the proving grounds of the nation's principal automobile manufacturers really reveal many of the "bugs" of mass production and help the seller to provide the buyer with a car that in most cases is "fool-proof."

Of course, it is competition which spurs automobile builders to deliver cars that have few "bugs." It is competition which justifies the expense of almost unlimited research and exhaustive tests on proving grounds. But did you ever purchase a machine from a manufacturer who has a monopoly on a specialized market? Lack of competition enables this seller to ignore promises of delivery. He ships the machine before testing it. The "bugs" are ironed out on the buyer's floor. Six months can elapse before the machine functions properly.

Competition stimulates efficiency.

* * *

TAXICABS OF THE AIR: Executives in the metalworking industry will do well to watch the progress of the helicopter branch of the aircraft industry. During the last seven years 2800 of these craft have been built. Today six companies are engaged in manufacturing 13 models (p. 57) and additional production is in the planning stage.

The potential for helicopters to augment the service of speedier aircraft is being recognized more clearly every day. Numerous operators are petitioning for licenses to inaugurate feeder services to the larger commercial airfields. It is not unlikely that at some future time the helicopter will be to air transportation what the taxicab and local bus have been to intercity travel by rail, highway or air.

* * *

BETTER DISTRIBUTION: Sometimes one wonders whether or not we in the metalworking industry appreciate fully the flexibility of the efficient system of distribution that has been developed for the benefit of users of steel. Big tonnage customers can buy direct from the mills and about 50,000 of them do so. However, the requirements of many customers are not large enough to justify mill delivery. Also many customers require specialized services which mills cannot render. Their needs are handled best by steel warehouses (p. 67), whose services are sought by an amazing total of a half million customers.

As the time approaches when the supply of steel will exceed demand, mills, warehousemen and all buyers of steel will be confronted with problems inherent in a buyer's market which have not been experienced generally for more than a decade. Sellers and buyers will feel the impact of economic changes that have been building up during the postwar period. It is to be hoped that adjustments to meet these changed conditions will make for an even better steel distribution system.

* * *

UTILIZING MANPOWER: Figures put out by the National Planning Association indicate that the United States has a serious manpower problem that deserves much more attention than it has been receiving. The association says that men in Russia outnumber those in the United States by 40 million and that Russia is turning out 30,000 engineers annually compared with 23,000 engineering graduates each year in the United States.

NPA believes that the solution to this problem (p. 62) lies in "upgrading" the American workforce. Certainly we do not employ all available workers to the best advantage. NPA says we should bring marginally-employed workers up to their capacity and also elevate scientific personnel so that their talents are fully utilized. Undoubtedly there is much opportunity for improvement in these directions.

...use in narrow aisles and congested areas?

...jobs where driver gets on and off frequently?

...fast handling at all times?

...loading road trucks and freight cars!

If your answer is "YES" to any question, look at these plus features of the

MODEL F-38T
2000 lbs. Capacity

NEW ELWELL-PARKER "Cargo Scout"

ELECTRIC OPERATION—means power costs are only pennies per day. No vulnerable clutch and reciprocating parts to wear out. No battle with exhaust fumes. Noiseless operation does not interfere with inter-com systems.

UNIT ASSEMBLY—cuts repair time. All parts instantly accessible for lubrication or repairs. Major assemblies are completely independent, permitting swift removal for bench repair.

END CONTROL—fast, easy and safe for operators who must get off the truck frequently. Stand-up operation keeps the driver alert, provides better vision.

CONTACTOR CONTROL—insures fast, smooth starts and instant response to operator's demands. Just one handle controls speed and direction. Contactor controls are easier to maintain.

360° STEERING—plus a short, 57″ turning radius for close-quarters operation. Truck trailer and box car loading is faster. Small size elevators no longer a problem. Special device completely eliminates steering wheel kick-back.

TELESCOPING UPRIGHTS—permit use of all available storage area. 100″ of lift with only 68″ overall height with uprights retracted and a full 50″ of free lift.

GET ALL THE FACTS; *write The Elwell-Parker Electric Co., 4104 St. Clair Avenue, Cleveland 3, Ohio.*

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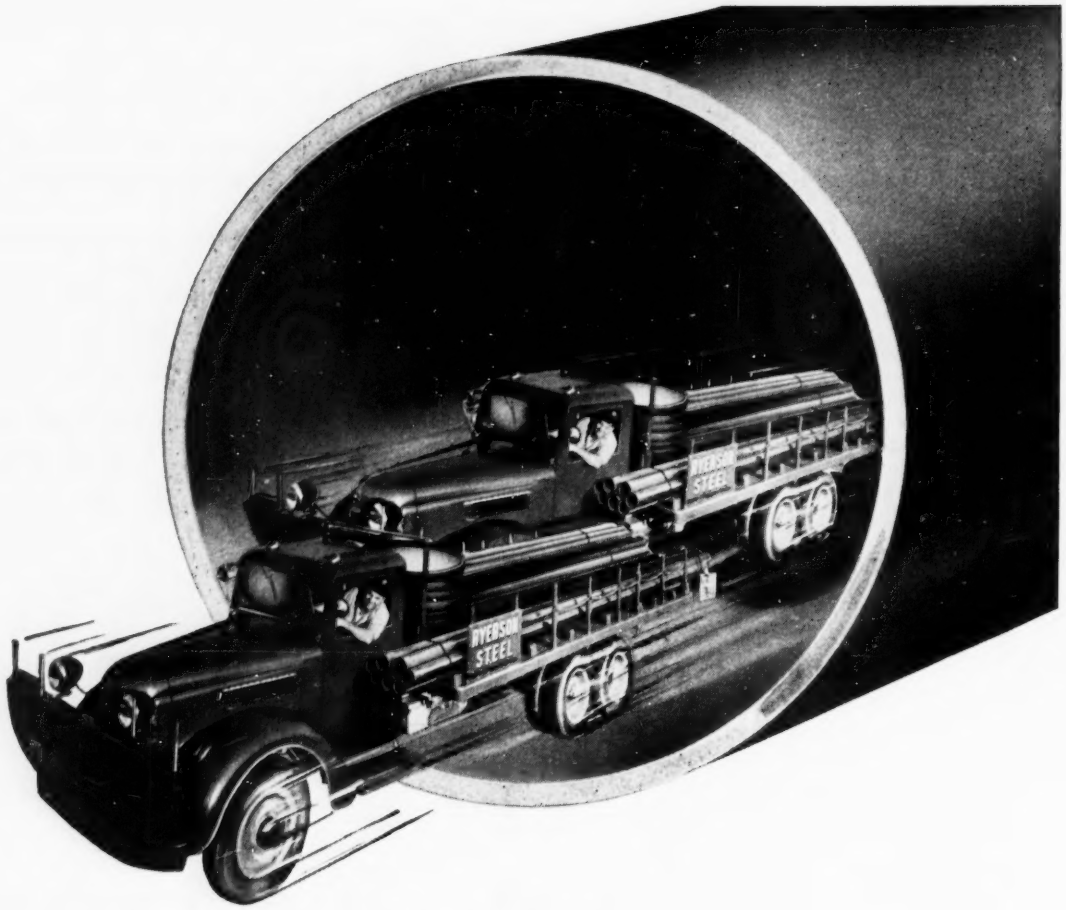
Established 1893

"Cargo-Scout" = famous E-P dependability plus Remarkable Maneuverability



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. . . One Tube or a Truckload

Need boiler tubes in a hurry? Seamless or welded—any size—your nearby Ryerson plant can give you quick delivery of one tube or a truckload.

That's because Ryerson stocks are large and complete, and Ryerson facilities for fast handling, cutting, loading and dispatching permit around-the-clock service. When a boiler is down a call to Ryerson will help you get it back in service fast. When you need tubes for routine replacement or regular production you can depend on Ryerson deliveries to keep your work schedule.

And all boiler tubes from Ryerson meet our Certified Quality standards, conform to all code requirements and are made and tested in accordance with the latest ASTM and ASME specifications. So you'll find that Ryerson tubes are easy to install—safe and long-lasting in service.

Another reason for calling Ryerson: you'll save time by ordering boiler tubes with all your other steel-from-stock requirements from one convenient source. One call, one order, one invoice does the work of many. So get in touch with your nearby Ryerson plant for boiler tubes and everything in steel.

These Products, Too

- Bent Boiler Tubes
- Condenser & Heat Exchanger Tubes
- Copper Ferrules
- Tube Expanders
- Heads-Flanged, Dished, etc.
- Manhole Covers & Fittings
- Manhole Saddles, Welding Flanges
- Flange & Fire Box Plates
- And everything in carbon, alloy & stainless steel

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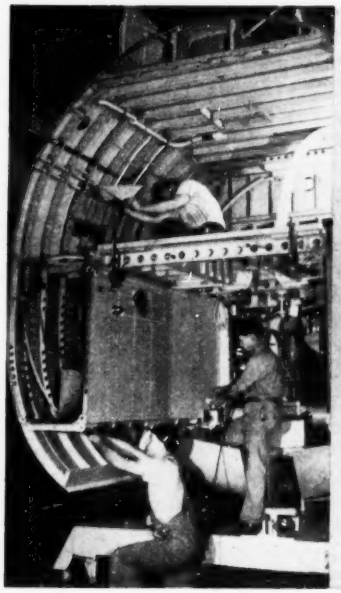


Aircraft Production Soars

(Units Produced)

Year	Military	Civilian	Total
1939	2,195	3,715	5,910
1940	6,019	7,098	13,117
1941	19,433	6,844	26,277
1942	47,836	985	48,821
1943	85,898		85,898
1944	96,318		96,318
1945	47,714	2,047	49,761
1946	1,669	35,001	36,670
1947	2,100	15,850	17,950
1948	2,284	7,302	9,586
1949	2,544	3,545	6,089
1950	3,000*	3,520	6,520*
1951	4,800*	2,675	7,475*
1952	9,000*	4,000*	13,000*
1953	12,000*	4,000*	16,000*

* Estimated by Aircraft Industries Assn. Military production since 1949 is classified information.

Aircraft: No Forced Landing Yet

Proposed administration cuts in Air Force budget will not have much effect on the industry's activities this year or next. Wilson favors cutting lead time

LOOK FOR GREATER activity in the aircraft industry this year than any year since 1945 despite the proposed Eisenhower-administration cutbacks in spending for the Air Force.

An estimated 16,000 new aircraft of all types will take to the air in 1953, or 3000 more than last year. Not since 1947 has the industry produced that many, and not since the last year of World War II has airframe weight been so great.

Halved—The administration has recommended that the appropriations for the Air Force for fiscal 1954 be cut from the $16.7 billion asked by former President Truman to $11.6 billion. Of the original request $6.1 billion was tabbed for procurement of planes; the amount passed by the House was the new administration's figure of $3.09 billion, a cut which caused great concern to many of the 60,000 companies in the program.

But as Adm. DeWitt C. Ramsey, USN (Ret.), president of Aircraft Industries Association of America Inc., points out, "These appropriations will not be translated into completed aircraft until 1955 or 1956 . . . (and) will not have an appreciable effect on the aircraft industry's activities this year."

Ditto—The same could be said for 1954. The industry now has a backlog of about $18.5 billion, most of which is military. The government probably will increase its purchases for aircraft from $7.5 billion in fiscal 1953 to about $10 billion in fiscal 1954, which means heavy production until at least 1955.

There will be some cancellations, such as the multimillion-dollar contract at Kaiser Motors, but they are normal in any defense program. And there may be further cutbacks in schedules, such as in airplane engines, which result from improper planning and imbalance. But none of that can be traced as yet to the current Air Force appropriations cut.

By the Calendar—Total expenditures for aircraft this calendar year will be about $12 billion. The military portion of that will be about $10.8 billion. Appropriations for military aircraft are divided about as follows: 40 per cent for airframes, 30 per cent for engines, 25 per cent for electronics and the remaining 5 per cent for instruments and miscellaneous equipment. In jet-propelled planes, the engines account for relatively more, and in guided missiles electronics takes about 50 per cent.

As far as the current appropriations cuts are concerned, Secretary of Defense C. E. Wilson says they won't mean the loss of a single plane. One way he intends to accomplish this is to cut lead times from the present three years to two. He points out, for instance, that a long lead-time component, such as landing-gear struts which take 13 months, could be ordered far in advance of a short-lead-time item taking perhaps only 6 months. Then, if the program has to be cut, the only loss would be the landing-gear struts, which are 5 per cent of the plane's cost.

Skeptics—His viewpoint is meeting with some opposition. His opponents question whether he can cut the lead time to two years. They feel he will have to revolutionize government procedures to do it. While the opposition in the House was not enough to scuttle his plans, Senate opposition last week was expected to result in a close vote on the appropriations.

Helicopter Sales Go Straight Up

Helicopter production has achieved full industrial status. In the last seven years, aircraft's youngest branch produced 2800 units.

Six helicopter companies are in active production on 13 models, but many more are in the planning stage. These range in size from one to 60-place craft. Heavy weight-lifting models are being developed.

Currently helicopter producers employ 14,000 persons and have a plant area of 2,087,000 square feet.

Eastern Steel Buyers Study Freight Rates

They're more important than ever as Fairless begins production. U. S. Steel has a freight advantage over Bethlehem in Philadelphia, New York, other seaboard points

EASTERN steel buyers are readjusting their sights as a result of the recently announced prices on hot and cold-rolled carbon sheets at U. S. Steel Corp.'s Fairless Works in Fairless, Pa., near Morrisville.

The new prices at Fairless (Morrisville) of 4.025 cents a pound on hot-rolled sheets, 18 gage and heavier, and 4.875 cents on cold-rolled sheets represent a premium of $2 per ton over the base prices at Bethlehem Steel Co.'s Sparrows Point, Md., plant which have established the minimum delivered prices at Philadelphia, New York and various other leading consuming points along the seaboard. The lower freight rates, however, will give Fairless an advantage in Philadelphia and at numerous other places despite the $2 premium.

Comparison—On the basis of a 0.138 cent-per-pound rate into Philadelphia on steel in 40,000-pound carlots, before the 3 per cent tax, hot-rolled sheets from Fairless will be 4.163 cents, delivered in that city, and cold-rolled sheets 5.013 cents, against 4.258 cents and 5.1085 cents, respectively, on hot and cold sheets from Sparrows Point. Shipments from that Bethlehem plant involve a 0.3335 cents-per-pound rail rate on steel in 40,000-pound carlots, before the 3 per cent tax.

The rail rate from Fairless to Philadelphia on 80,000-pound carlots is 0.1035 cents per pound before the 3 per cent tax. Actually, on an 80,000-pound carlot basis, Fairless will have an advantage in Philadelphia on sheets, despite the $2 per ton premium, of 49 cents per ton, and on a truckload basis, 78 cents per ton.

Matter of Geography—Broadly, and on an 80,000-pound carlot basis, it appears that Fairless will have an advantage to all points in New Jersey, except in the southern tip of the state, also an advantage in a relatively small section of eastern Pennsylvania, and an edge in southeastern New York state, and in all of Connecticut, Rhode Island, most of Massachusetts and a part of New Hampshire and Maine.

NO. 1 FURNACE AT FAIRLESS WORKS
. . . where production is accelerating

Bethlehem's Lackawanna, N. Y., plant, where the sheet base prices are the same as at Sparrows Point, will help curb the scope of the Fairless advantage in New England and the greater portion of New York state. Fairless will be at a disadvantage throughout Vermont, also in the northwest section of Massachusetts, including Pittsfield and Greenfield. Too, it is understood that it will be at a disadvantage in Springfield, Northampton and Holyoke, Mass.

Sparrows Point will have the advantage at Wilmington, Del., and Reading, Hazelton and Wilkes-Barre, Pa., and also among other eastern Pennsylvania consuming points at Steelton, York, Harrisburg, Chambersburg and Williamsport.

Matter of Production — Sheet production at Fairless will get under way late this month on a limited scale, both with regard to tonnage and size of sheets. Size range will be restricted until the slab mill gets into operation, probably sometime late in September. Meantime, slabs for Fairless will be turned out in the blooming mill which is limited to narrow widths and which is currently supplying tonnage for the Irvin Works.

No Premium on Tin Plate—Fairless has named $8.80 a base box of 100 pounds for common coke tin plate, $7.50 a base box of 100 pounds for electrolytic tin plate, 0.25 pound coating, and $6.60 for black plate. Unlike the prices for hot and cold-rolled sheets, these quotations are at the same levels as those prevailing at Sparrows Point and the advantage of Fairless on tin plate in Philadelphia is $2.49 on shipments by rail in 80,000-pound carlots and $2.78 a ton on trucklots. Tin plate operations are expected to get into swing by the end of this month.

Hot sheet finishing capacity at Fairless is 235,000 tons per year and cold sheet capacity 290,000 tons. Tin and terne plate capacity is 170,000 tons. Total finishing potential is 1,260,000 tons. Remainder of the capacity is taken up with 280,000 tons for butt-weld pipe, 195,000 tons for bars, and 90,000 tons for reinforcing bars. (For more detailed Fairless prices and market comment, see p. 164 and following.)

McLouth Obtains Expansion Fund

McLouth Steel Corp., Detroit, has completed arrangements which will place $106 million at the company's disposal for expanding its Trenton, Mich., facilities into the second integrated steel mill in the Detroit area, the world's largest steel consuming center.

Financial negotiations were arranged by First Boston Corp. with Metropolitan Life Insurance Co., Prudential Insurance Co. of America and a group of four banks headed by National Bank of Detroit.

Two of the company's customers —General Motors and American Metal Products Co.—will help finance the expansion by purchasing $25 million of new McLouth preferred stocks.

The expanded installations — scheduled for operation in 1955— will increase the annual capacity of McLouth to 1.2 million tons from the current capacity of 550,000 tons a year. At present the only integrated steel mill in the Detroit area is the National Steel Corp.'s Great Lakes Steel plant, with an

annual capacity of 2.4 million tons.

Scheduled for the McLouth program are a blast furnace, two Bessemer converters, two large electric furnaces. The company's hot-strip mill will be reconstructed and its cold-reducing and finishing facilities will be expanded so they can produce an additional 935,000 tons of flat-rolled steel annually.

Construction Records Continue

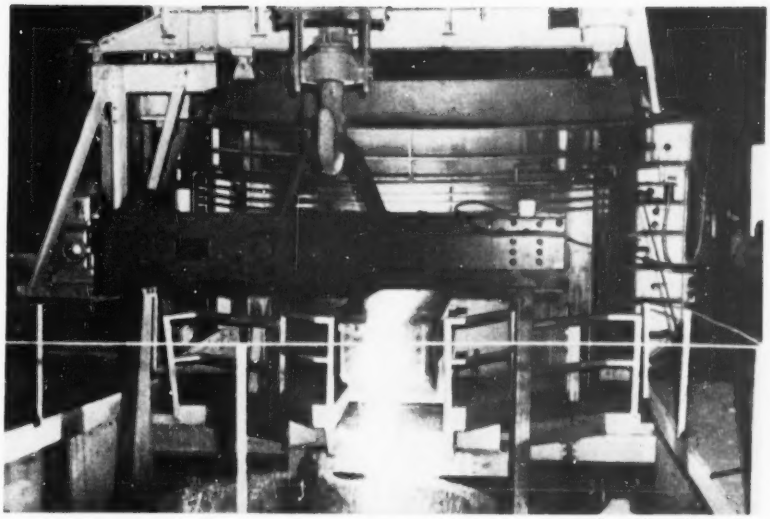
New construction for 1953 looks better and better as the year progresses.

Two months ago, STEEL reported that 1953 held an advantage of about 6 per cent over 1952 in total new construction outlays (May 11, page 75). Now figures for the first half show that the advantage has increased to 7.7 per cent despite the fact that 1952 got better as it went along. Thus, 1953 is getting still better, and it could easily hit the predicted $33-billion mark or more.

Half-Way — At the half-way mark last year, expenditures for new construction totaled $14,821 million and went on to set a new record of $32,638 million. By the end of the second quarter this year, new construction amounted to $15,967 million, more than $1 billion ahead of the 1952 pace.

Only seven categories in the joint estimates of the Labor and Commerce departments showed declines from last year's figures. They were: Industrial, off 0.8 per cent; hospital and institutional, private, off 21.2 per cent and public, off 13.2 per cent; miscellaneous private, off 12 per cent; farm, off 6.4 per cent; public residential, off 15 per cent; and miscellaneous public service enterprises, off 5.7 per cent.

No Tail-End—Month by month, 1953 has been getting better, indicating that the high level of construction has not been just the tail-end of last year's boom. Even when adjusted for price changes, the new figures represent an increase. Spending for commercial construction this year has been heavier than was expected, and industrial construction, which was down only $10 million over the period, was stronger than most industry men would have predicted six months ago.



Owensboro Messenger

"Big Sid" pours first heat as . . .

Green River Steel Starts Production

FOR YEARS Sidney Williams dreamed of a small regional steel mill. He believed such a plant could be designed to give a higher yield of finished steel from ingots and to permit closer control over quality.

His dream became a reality July 8 when the first heat was tapped from "Big Sid," first of two 70-ton Swindell electric furnaces at the Green River Steel Corp., Owensboro, Ky.

Vest Pocket—The mill will have a melting capacity of 20,000 tons a month. Rolling capacity is 30,000 tons a month and the company will process ingots from other mills.

First products will be bars in the larger sizes, from 8⅝ inches to 2 inches. Company also will offer rounds to 8⅝-inch maximum, billets to 8 x 8 inches, blooms and slabs. Initial production will be quality carbon steel although the company soon will produce alloys.

Regional Market—The company frankly is pinning its hopes on a regional market where it will enjoy a substantial freight advantage, by rail or water, over the larger mills to the north. Immediately, the demand for large carbon bars is so high that the mill's output can be sold in distant markets.

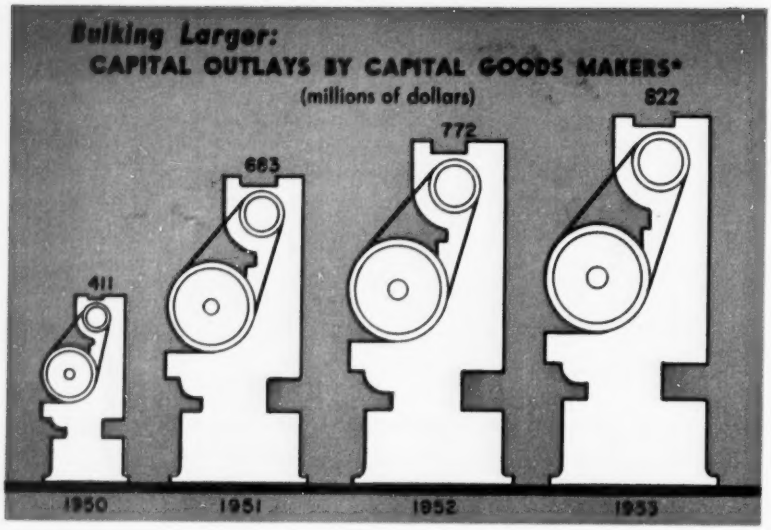
Competitive — Mr. Williams believes Green River can be competitive with the larger mills. One reason for this is the use of the Dornin process which is claimed to yield a minimum of 90 per cent sound steel from ingots. A hot-top ingot of conventional tonnage mill size produces about 78 per cent sound steel.

In the Dornin process the ingot is teemed into a big-end-up mold of heavy taper. The segregate zone is punched on a heavy press and isolated by upsetting. The ingot then is forged to rolling shape.

Equipment — Facilities include two 70-ton electric furnaces, eight soaking pits, a 2500-ton upsetting press and a 1500-ton forging press, a 25-inch, 2-high reversing blooming mill, one 3-high stand and one 2-high stand of 24-inch bar mill, and necessary auxiliary equipment.

Who's Who — Mr. Williams is president. His steel mill experience dates back 40 years, during which he was director of sales for Timken and executive vice president of Copperweld.

Charles P. Hammond is general superintendent of Green River. He formerly was with Rotary Electric. Paul E. Barley, maintenance superintendent, came from A. M. Byers. Lee V. Shilling, mill superintendent, comes from Copperweld and Robert H. Spence, melt shop superintendent, gained his experience at Armco.



* Spending for new plant and equipment by machinery (other than electrical) makers.
Source: Commerce department and Securities & Exchange Commission

Capital Goods Firms: Surprise Spending

Capital outlays by machinery makers other than electrical will rise 6 per cent in 1953. Emphasis shifts from expansion to plant modernization

ECONOMIC SURPRISE of the year is the continued high rate of capital expenditures by capital goods producers. It's even more surprising than the gain for all U. S. business in new plant and equipment spending which is expected to reach a record $27 billion in 1953.

Those total outlays were supposed to drop after 1952. Certainly the spending by capital goods makers was anticipated to fall. Such manufacturers are usually in the first wave of expansions and modernizations because they make the machines necessary before end-product makers can expand and modernize.

No Slouch—While no precise figures exist to measure the extent of capital spending by capital goods producers, a statistical series developed by the Commerce department for expenditures by makers of machinery, other than electrical, indicates the trend. Those machinery makers plan to spend $822 million for new plant and equipment in 1953, a 6 per cent rise above last year as shown in the chart. Squeezing inflated dollars out of the picture shows a real rise in plant and equipment purchases of at least 4 per cent.

In a survey by STEEL, capital goods producers themselves evidenced surprise that the capital investment trend was still up. Consensus of such producers was that rounding out of nearly accomplished expansions and, more importantly, modernization of plant account for the rising trend. One foundry equipment executive put it this way: "Automotive companies are still expanding; the steel industry is rounding out its expansions; machine tool stockpiling and the elephant tool program are still building up; and stand-by facilities for aluminum, magnesium, titanium and cast armor are still being programmed. In the aggregate that means a lot of activity."

Good Advice—Then, too, capital goods producers are taking their own advice on modernizing equipment.

"Expansion is past its peak but there's a vast amount of modernization going on," says one materials handling executive. Towmotor Corp., Cleveland, is making a plant addition which will approximately double present manufacturing space. "But it would not be correct to call this simply an expansion since we plan to modernize and improve manufacturing lines for increased efficiency and higher production," says H. E. Boehm, comptroller of the firm.

No Exception—"Accomplishment of the expansion peak has passed among press builders," says one of the industry's executives, "but our company has put a significant amount of money aside for re-equipment purposes and I don't think we're any exception in the industry."

Still, capital goods producers have some special problems in modernizing which do not confront volume producers. Automatic process machinery may not pay back economies in labor savings if the company only produces two or three units a year instead of thousands or millions. Some capital goods makers must work with heavy, bulky workpieces which do not lend themselves to modern materials handling equipment. Technical advancements have not been as significant in the heavy, universal types of machine tools, used by capital goods firms, as in the high speed production types. Thus, capital equipment makers' facilities do not obsolete as rapidly as mass production lines.

Spending for Safety—The point is capital goods producers are modernizing not because a machine is so-and-so many years old, but because they know their competition is increasing. Capital goods firms are spending in order to hold onto their place in the market. And that hits the statistics right in the expenditures on new plant and equipment column.

U.S. Scrap Program Attacked

The Institute of Scrap Iron & Steel says it has carried to Congress its fight against the proposals of the armed forces to include $30 million of the Defense appropriations for fiscal 1954 for scrap processing equipment and transportation of scrap.

Expansion of the government's portion of the scrap business would not only depress business in the scrap industry, but result in a considerable loss to the government, says the institute.

Vending Machines: From Nuts to Soup

Such diversification of automatically-vended merchandise has created problems for manufacturers of the machines, but it has also boosted sales

FROM NUTS TO SOUP describes the progress of vending machines, which this year will spill forth more than $26-billion worth of varied merchandise from more than 3 million of the coin-operated machines.

These 24-hour, one-armed salesmen, which started largely as penny peanut machines, now dispense large and small items of all shapes and conditions. The fully automatic lunch counter, for instance, is no longer an oddity. A person with a few coins can start at a milk-dispensing, refrigerated machine, pass on to a hot-soup device and on down the line until he gets a pack of his favorite after-dinner cigarettes or cigars. On his way out, if he feels in a good mood he can deposit a few coins in another machine and take home a pair of nylons for his wife.

Money Problems—This diversification of vended products has created many problems for the more than 100 makers of automatic vending machines. Coin changing has been one of the biggest headaches, but it is being overcome. Officials of Viking Tool & Machine Corp., Belleville, N. J., report that in the works is a machine that can handle anything from a nickel through $1.50 in coins for use in chain stores.

The problem of heating or refrigerating some products has been responsible to a large extent for the trend away from the mechanical machine to the electrically-operated mechanisms.

King-size Problem — When the tobacco companies decided to swing to king-size cigarettes, it caused a flurry in the vending machine industry. For some time, cigarette machines have been the biggest automatic venders, currently accounting for about 475,000 units and dispensing about $675-million worth of smokes a year. So manufacturers had a busy time converting the old machines to accommodate both regular and king size.

Difficulties of another nature are taxation and investment capital. The National Automatic Merchandising Association, Chicago, claims that some states make vending machines subject to forms of taxation to which other methods of distribution are not subject. Also the industry is plagued with high interest rates and insufficient capital for normal expansion. The association says this comes from unfavorable attitudes of banks stemming from amusement and gambling machines plus a high obsolescence in some machines.

Operators—Manufacturers generally do not sell the machines to individual users but to operators who place and maintain a number of machines. Robert Z. Greene, president of Rowe Corp., New York, one of the largest producers in this country, says there are about 4000 operators doing about 90 per cent of the selling volume. The machines they operate sell about 20 per cent of all soft-drink beverages, 20 per cent of all candy bars and 16 per cent of all cigarettes. In regard to the latter, Mr. Greene points out that average sales per machine per day are 15 packs. At that rate, "an operator is considered successful if his profits before depreciation and taxes equal his cost of machines in from two-and-a-half to three years."

Mr. Greene believes that "the use of properly dispersed automatic dispensers has solved multi-shift personnel food problems in many large plants." Also, his company currently is co-operating with the Pennsylvania Railroad in operating food and beverage-dispensing machines on one of the latter's trains. An executive of the railroad declares that such a program "can reduce the tremendous deficits American railroads now incur in their food sales."

More and more programs such as these, plus growing public acceptance of automatically vended goods, will push sales of the machines from between $1.25 billion and $1.5 billion last year to about $1.75 billion for 1953.

Employee Trust Buys Control

The employees' retirement trust of Arthur D. Little Inc., Cambridge, Mass., industrial research specialist, has acquired controlling interest in the company.

Under this form of ownership, which is particularly appropriate to its operations, according to E. P. Stevenson, president, majority control of the corporation will be exercised by the employees through the fund's trustees.

The change of ownership occurred when the trust offered to purchase the shares of common stock held by individuals. In this manner it was able to buy for $1.3 million the shares which were held by Massachusetts Institute of Technology.

Proceeds from this sale will be used by MIT to aid its educational and research projects.

GE Will Increase Research Staff

General Electric Co., Schenectady, N. Y., in the next few years will increase its staff working on fundamental research by about 50 per cent, or to 1500 persons. Ralph J. Cordiner, president, says that the expansion will include the addition of 180 scientists to the 270 scientists now engaged in fundamental research for the company.

Wanted—Fuller Use of Manpower

Russia nears America's technological level, planning group warns. Underemployed workers and scientists must be put to best possible use

THE NATION'S manpower problem is twofold, the National Planning Association declares. Shortages are being felt in relation to America's military and scientific needs and in comparison with the heavy population of Communist countries.

Full mobilization, if necessary at this time, would point up the major national weakness—shortages of trained men for national defense—the association continues. Russia outnumbers America by 40 million men. Low birthrates of the 1930's are partially responsible for our current shortages.

Premium on Engineers — To match Russia's millions, America must rely on a higher rate of technical progress, NPA stresses. While industry had once employed one engineer for about 300 employees, production and communication industries now need an engineer for as few as 50 workers. The demand for specialists is soaring, together with the level of technology.

Comparing America's advances in technology with those in Russia, NPA underscores this nation's slow progress, particularly in training engineers. Russia allows complete deferment from military service for technical students in such fields as aviation, machine tools, heavy machinery, shipbuilding and ferrous and nonferrous industries. Russia is graduating 30,000 engineers a year, compared with the current American turnout of 23,000 annually.

Closing the Gap—NPA recommends two long-range goals of American policy to overcome Russia's technological gains. First, the objective should be to raise the number and level of opportunities available to American scientific students. Secondly there must be sufficient numbers of trained men available for these positions.

This full use of manpower will require placing of scientists in jobs in which they can work at full capacity, NPA continues. Greater use must be made of the physically handicapped, the elderly and minority groups. Women must be employed to a greater extent. Underemployment, the use of men at barely productive work, is as wasteful and uneconomical as unemployment.

Remedy—Solutions to our twofold manpower problem, concludes NPA, depends on "upgrading" the workforce. This means bringing marginally-employed workers up to their capacity and elevating scientific personnel so that their knowledge and ability may be fully used.

For Long Loads on Short Hauls

Finding semirigs cumbersome for short hauls in city traffic, Slack Steel & Supply Co., Seattle steel distributors, designed this unusual truck. Chassis is a standard GMC cab-over-engine unit with a special narrow cab with flat bed extensions projecting forward on either side. Forty-foot structural shapes can be carried on either side of the cab, and a built-in rear bed extension permits carrying 30-foot limber steel plate back of the cab

New Steel Highs: Workers, Pay

Employment and wage earnings in the iron and steel industry established new records during May. Employment reached a total of 685,000 and average hourly wages rose to a new high of $2.222, according to the American Iron & Steel Institute.

Although wage earners worked an average of 39.9 hours a week in May, as against 41.0 hours per week in April, the steel wage agreement wrought an increase of 1.9 cents more in their average hourly wage.

The net effect of the higher wages, reduced working hours and higher employment resulted in a payroll totaling $280,953,000 during May, $2,629,000 more than in April.

Lukens Raises Salaries, Day Rate

Lukens Steel Co., Coatesville, Pa., is increasing base salary and day rates per fiscal period by 4.5 per cent or $14, whichever is greater, with a maximum limit of $42 per fiscal period. These increases, effective as of June 15, cover all salaried and day-rate personnel up to, but not including, principal officers of the company and members of the management committee.

Students Swell Labor Force

With students swarming into the labor force, employment rose sharply in June. Civilian employment in the week ended June 13 totaled 63,172,000, according to the U. S. Commerce department. This count was 1.5 million higher than the May level and about the same as last year's record June total.

The Mobilization Base

Defense Mobilizer Flemming reveals it will not deviate much from the old Truman plan

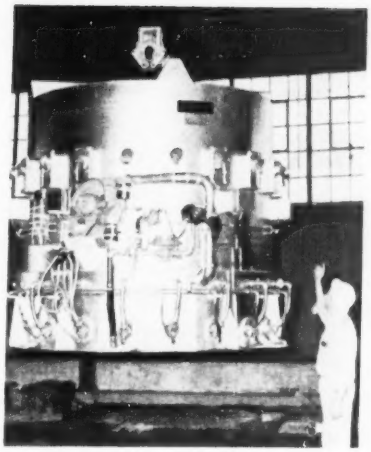
THE CURTAIN that concealed the thinking of the Eisenhower administration for long-term mobilization is starting to rise.

First glimpse at what is the rough draft of the government's new mobilization plan is probably revealed in a statement of Defense Mobilizer Arthur Flemming. His statement indicates that the government will follow the "broad mobilization base" policy of the Truman administration, instead of the "narrower" industrial base for military production, which has been preferred by several key defense officials.

Awaiting Approval—Mr. Flemming states—with cabinet approval—that prospective gaps in raw materials and production facilities must be filled, in case of an all out war. The Defense department, however, won't undertake definite projects for machine tools and stand-by plants until Congress approves the 1954 Defense Department Appropriations Bill, which earmarks $500 million for such tools and facilities.

Starting point of the mobilization program will be a calculation of how much U. S. industry can be devoted to war needs following M-Day, after allowing civilians only a "rock bottom" economy. When the study is completed, defense planners will measure the capacity of individual industries to provide the weapons desired by the armed forces. Using this data, the administration will shape its final mobilization plans.

Cutback Still Coming—The new program may bolster industrial construction in the months ahead, but isn't expected to halt the government's policy of closing its secondary sources of war goods when costs are deemed too high, as happened at the Willow Run, Mich., plant of Kaiser Motors Corp., or when reserve stocks and production rates have attained the desired levels. The recent cutback in the heavy press program (STEEL, June 29, p. 44) says Mr. Flemming, resulted from re-evaluation in the light of technological advances and doesn't involve the government's program for broad mobilization.



Hot Pot

Facilities for pot annealing in the Los Angeles wire mill of Bethlehem Pacific Coast Steel Corp. are being expanded by the addition of this bell-type annealing furnace. It will increase wire production capacity

Stand-by Contracts Asked

Stand-by facilities for producing armaments must be kept in up-to-date condition and the Defense department should be empowered to enter long-term contracts with armament producers to carry out this policy, says the American Ordnance Association.

The association recommends that the government should enter into contract with civilian producers who are currently using government plants and production equipment, placing the care and surveillance of the facilities when in stand-by condition with the private companies.

Metalworking Loans Stay High

Private loans to metalworking companies declined only 3.5 per cent last year, despite the well-publicized tightness of the long-term money market. Private placement financing in the iron and steel, metals and related industries in 1952 totaled around $465 million, as compared with $482 million in 1951, according to *The 1953 Yearbook of Private Placement Financing*, published by E. V. Hale & Co., Chicago, private placement specialists. Some 31 companies obtained such long-term loans in 1952, compared with 21 companies a year earlier.

Largest loan to a metalworking firm was $148 million in first mortgage bonds (due 1980), carrying an interest rate of 4.25 per cent, which was issued for Reserve Mining Co., a joint enterprise of Republic Steel Corp. and Armco Steel Corp., to construct taconite facilities in the Mesabi range of northern Minnesota.

Reynolds Reduction Co., an aluminum-producing subsidiary of Reynolds Metals Co., Louisville, obtained the second largest loan with the issue of $76.7 million in first mortgage bonds (due 1968), carrying interest rates up to 5 per cent after the first year or two.

CHECKLIST ON CONTROLS

COBALT, MOLYBDENUM — Revocation on June 30, 1953, of Schedules 2 and 4 of NPA Order M-80 and Direction 1 to M-80 and Schedules 2, 4 and 5, effective that date, removes allocation control over cobalt and molybdenum. Amendment 1 of M-80, issued and effective June 30, makes the regulation conform to the revocations.

NICKEL—Amendment of June 30, 1953, of Schedule 1 of Order M-80 provides that nickel consumers who are permitted to obtain 100 pounds of nickel per month without applying for an allocation must certify that the metal will be used in their own plants. It was effective June 30.

COLUMBIUM AND TANTALUM — Amendment of June 30, 1953, of Schedule 5 of NPA Order M-80 removes columbium and tantalum from complete allocation and exempts melters and processors using those materials from filing report forms NPAF-60, NPAF-102, NPAF-113, and NPAF-114. Amendment was effective June 30. Restrictions on the uses of columbium-tantalum are retained.

DMS POLICY — Defense Mobilization Order No. 28, issued July 1, 1953, sets forth the basic organization and policy on the control of materials and facilities by the use of priorities and allocations authority.

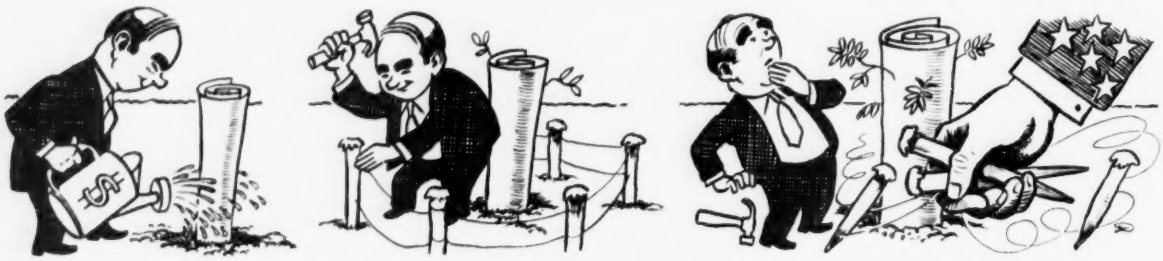
Appointments in Washington

Arthur K. O'Keefe, sales production co-ordination manager, Naugatuck Chemical Division, U. S. Rubber Co., was named deputy administrator, National Production Authority.

S. Scott Hall is the new head of Technical Services, British Joint Services Mission, and will represent the U. S. to the British Ministry of Supply on matters concerning defense research and development.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*



The power of the atom is at industry's behest;
You have plans you might develop?
Then go ahead—invest!

Of course you'd like a patent on the process you're directing;
It took a pile of money, so your method's worth protecting.

Then Uncle Whiskers comes along, and fills you with dejection:
"Develop any process, but—please don't expect protection!"

Industry says that Congress must revise the Atomic Energy Act to provide for patent rights before private firms will start expensive programs to develop the atom commercially

PRIVATE industry is ready and willing to begin commercial development of atomic energy with its own money, but demands the patent rights to the ideas it perfects in the process.

That was the purport of testimony before the Joint Congressional Atomic Energy Committee by spokesmen for four industrial teams that have been studying private atomic energy possibilities for two years.

Normal Incentives — Walker L. Cisler, president, Detroit Edison Co., said private industry can develop the field better and faster and cheaper than the government. He estimated it would take 10 years for his group to complete construction of an atomic project. But this isn't too long, considering that it takes four or five years to build a conventional power plant. "Normal incentives of patent protection must be provided," said Mr. Cisler, if private capital is to be invested on the large scale required. Unless Congress amends the Atomic Energy Act to permit patenting, he said, it is the belief of his company, Dow Chemical Co., and others in his group that the capital "will flow to other areas of scientific development."

The same thought was expressed by Edwin J. Putzell Jr., Monsanto Chemical Co., spokesman for a group headed by Monsanto. Lack of protection of private patent rights, he said, definitely would retard progress in atomic power.

System Outlined—J. W. McAfee, president, Union Electric System of Missouri, and Vice Adm. Earle Mills USN (Ret.), president, Foster-Wheeler Corp., agreed that the time has come for private industry participation. Admiral Mills outlined a patent system which would protect private industry in the commercial field and the government in atomic weapons.

Somewhat modified was the view of Willis Gale, chairman, Commonwealth Edison Co., who thought the first civilian atomic power plant should be built "under some sort of a partnership agreement with the government." He thought it would be a serious mistake to turn the whole program over to private industry.

Extend Contract Adjustments . . .

Under Public Law 97, signed on July 1, the contract authority of the President under Title II of the First War Powers Act is extended through June 30, 1954, without any change in wording. This measure permits adjustment of contract terms in the contractor's favor "when such action facilitates the national defense," thus encouraging the Defense department to stick to its policy of consenting to such adjustments only in the case of contractors "essential" to the national defense.

A group headed by Sen. Edward J. Thye (Rep., Minn.) attacked this concept as unduly harsh and restrictive to small firms engaged in defense work, and as not in keeping with the wishes of Congress in writing Title II.

Catching Wasters of Metal . . .

Because waste of critical metals has become excessive at the plants of some of its contractors, the Air Force has perfected a system for locating such cases and insuring immediate remedial action.

This is provided for by AMC (Air Materiel Command) Regulation 70-30 which covers all types of production scrap; it fixes in Air Force personnel the authority to prevent undue wastage of government-owned metal. It is built up on the philosophy that when a machine is out of tolerance and producing defective work it should be stopped and adjusted immediately.

When such instances occur, the Air Force inspectors will report them to the contracting officer and, at the same time, to the plant management. Immediate corrective steps will be expected from the contractor, and the results of such corrective steps will be reported to the contracting officer. The records so compiled will be used to disallow cost claims based on excessive scrap production, and will be considered both in price redetermination and renegotiation.

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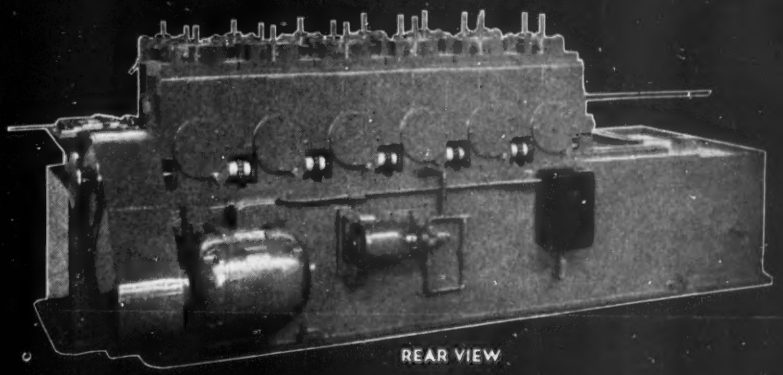
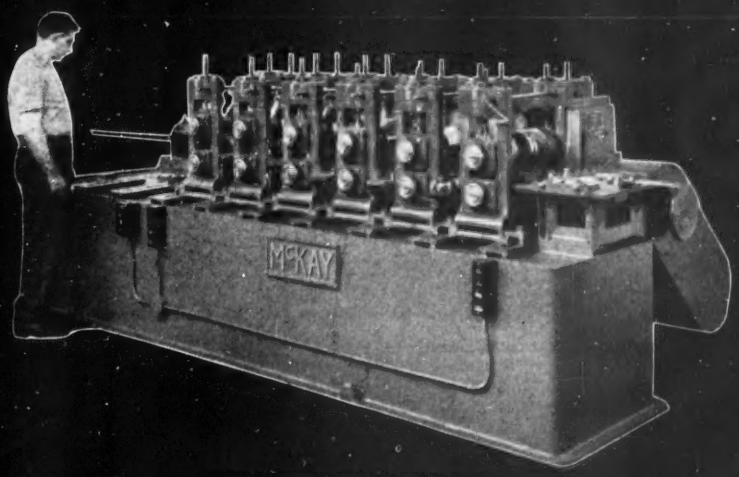
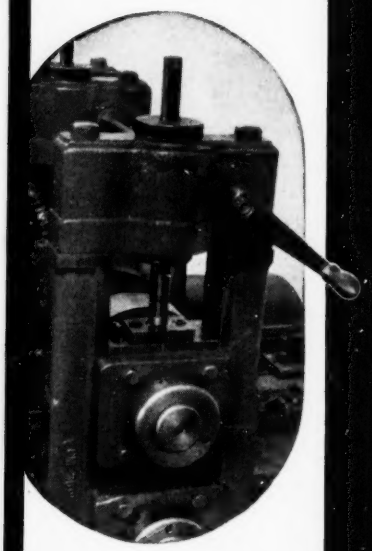


REAR VIEW





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MOTOR DRIVEN COOLANT PUMP. Supplies flushing fluid to the rolls at each roll pass, and provides a rust preventative treatment to the formed strip. Tanks for fluid are built integral with the welded steel base.

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PRODUCTION STEEL CO. OF ILLINOIS
2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y.
Phone: Riverside 7920

SALES OFFICES:

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Phone: Broadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
7521 West Dixon St., Milwaukee, Wisc.
Phone: BLuemound 8-8323
Warren P. Bidwell, Sales Representative

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Phone: Culver 7480
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1347 Northcliffe Rd., Syracuse, N. Y.
Phone: 73-5722
Dean Hethington, Sales Representative

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Phone: 5759
S. N. Olmsted, Jr., Sales Representative

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Phone: Howard 7407
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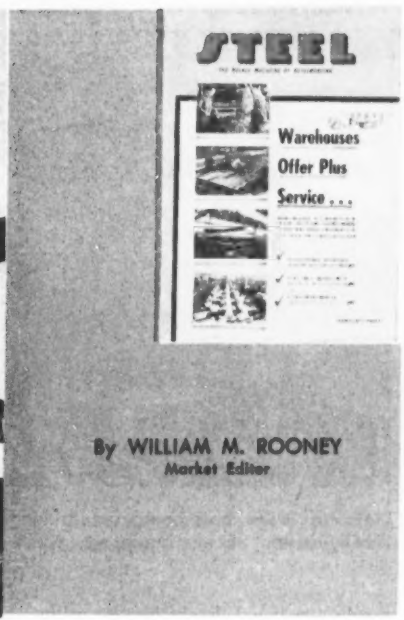


By WILLIAM M. ROONEY
Market Editor

Warehouses Set Sights To Meet Challenge

MORE than 85 million tons of finished steel will flow into consumption this year for a new all-time record mark. And, significantly, a substantial portion of the total, nearly 20 per cent, will reach users through the hundreds of warehouses over the country.

This is significant on two counts. It demonstrates the essential role of the distributor in the over-all scheme of steel distribution, and it confirms the basic steel industry's reliance on the warehouse function for economical and equitable handling of small lots and emergency tonnage.

At midyear, new production records are being chalked up by the steelmakers. Circumstances have permitted them to operate their mills at capacity unhampered by extensive labor trouble or other serious interruptions. Further, new melting and finishing capacity has been steadily coming into operation over recent months.

Shortages Persist—But despite the ever-mounting tide of steel, supply shortages have persisted. Only through realistic and practical distributing of available tonnage have severe curtailments in manufacturing operations, including defense work, been averted.

Much of the credit for this showing goes to the warehouse industry. It has provided yeoman service throughout the period of supply stress these past dozen years or so, serving large and small consumers promptly and effectively in the face of severe supply difficulties of its own. And its service record this year never was better, its functioning more vital, in keeping the wheels of manufacturing industry turning in high gear.

Change Is Coming—The position of the warehouse industry as an integral distributing arm for basic steel would seem assured by its record. However, with supply-demand balance approaching, it is evident the distributors face a period of economic adjustment which may mark a milestone in the marketing and distributing of small lots of steel. Walter Doxsey, president, American Steel Warehouse Association, gives five reasons for anticipating a change:

1—For the first time in more than a decade the steel industry is virtually free of federal controls.

2—Supply shortly may equal or exceed demand.

3—Price, quality and service again will resume their influence in all transactions, and buyers, rather than sellers, will set the market pace.

4—Volume will decline and unit costs increase. The break-even point will ride at an all-time peak.

5—Warehouses will feel the full impact of significant economic changes that have been building up since the war, such as sharp increases in rates for less-than-carload freight and trucking, and the substantial rise in the number of outlying warehouses in small cities that heretofore were considered secondary points of distribution.

Role Essential—Although steel warehousing dates from the earliest times in this country, importance of the distributor often is overlooked. But he plays an increasingly essential role in the economy, especially in caring for the needs of small consumers, and in providing emergency supply depots for larger users whose bulk

WAREHOUSES SET SIGHTS

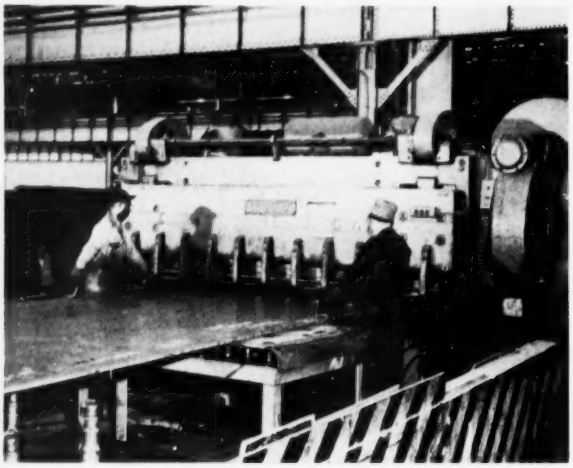
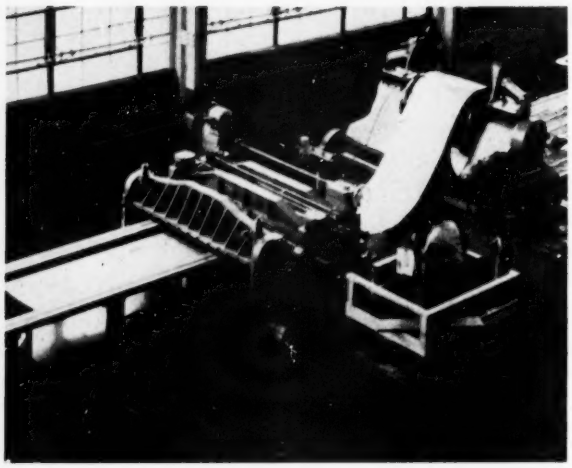


Plate on caster bed being cut to length on electrically-driven shear equipped with hold-downs



Automatic cut-off line for uncoiling and processing strip steel from coils into cut lengths

needs are filled direct by the mills. Quick delivery is the heart-beat of the service offered.

For all practical purposes, the warehouse industry is the small order department for basic steel, at least nine consumers filling their needs at the distributor level for each one depending on direct mill shipments. Actually, the warehouses provide grass-roots contact between the steel industry and the general public, they being closer to the rank-and-file of the nation than are the basic steel companies in their functioning.

Everyone is conscious of steel's major role in the economy, this versatile metal being the measure of our industrial power and greatness, intimately touching the lives of all literally from cradle to grave. But do you realize that relatively few Americans ever come into contact with the basic steel producing industry, whereas, almost everyone, at one time or another, has occasion to contact a steel warehouse?

Half Million Customers—Nearly 50,000 industrial consumers, in fact, buy from the mills. But more than half a million fill their needs at industrial warehouses.

There are three general types of warehouses. One group handles industrial products such as plates, structurals, bars, sheets, strip, tubing, alloys, stainless and tool steels. This class mainly caters to the manufacturing and building industries. There are approximately 1000 such distributors of this type over the country, handling in excess of 8 million tons annually.

The second group is made up of firms dealing in so-called "merchant" products, such as nails, fencing and other wire items, eavestrough, roofing, siding and conductor pipe; buttweld and lapweld pipe; electrical conduit and galvanized sheets. These are really industrial supply houses since they also carry related industrial items of all kinds. There are some 30,000 such firms in the country with total steel volume in excess of 3,500,000 tons yearly.

Finally, there is that class of merchant handling steel and pipe for drilling wells and transporting oil and gas. These stores, described as oil country warehouses, number about 80 and sell in excess of 2 million tons of steel products each year.

Economical Method — Why is steel distributed at all through middlemen? The answer is simple enough. Warehouse distribution is the most economical and practical method of handling small orders. It is estimated the average warehouse order for industrial steel products runs to about 1200 pounds, and that there are some 2 million such orders processed each month. For several years past nearly 20 per cent of all steel turned out has been moved through these warehouse plants, the proportion tending upward steadily, notably in certain products (see table on page 69).

Steel is produced in volume, general mill practice dictating the grouping and accumulating of orders of certain kinds and sizes to insure economical rolling. Orders of less than acceptable mill size, obviously, cannot be handled expeditiously, and this is where warehouse service comes in.

The distributor orders mill lots in standard sizes, shapes and analyses, and holds them in stock for small users who need but a relatively few hundred pounds at a time. In addition he provides "hurry-up" service to buyers facing supply emergencies because their mill shipments failed to arrive on schedule, or for some other reason.

Diversified Inventories — Representative warehouses carry large and diversified inventories. Some maintain stocks of literally thousands of sizes and shapes with total inventory running as high as 20,000 tons. Such houses are in position not only to handle orders for small mixed lots, but they can just as readily take care of a fairly large order for a single size or product.

Expeditious handling of the thousands of orders going through the warehouses necessitates maintenance of large buildings, furnished with the very latest in handling and shipping equipment. Some producing mills maintain warehouse subsidiaries with plants located at a dozen distributing points over the nation. In the main, however, the industry is

made up of medium-sized independent companies, many of which also have facilities at several points.

In recent years the tendency toward relocation of facilities has been evident. Not only have many of the old line warehouses established branch plants in new and growing industrial centers, but there has been a movement of plants from congested areas of cities to outlying districts and more centrally located distributing points. In such locations they not only can serve more than one industrial community, but they get away from the traffic difficulties common to the large centers. Further, new plants are constructed along lines that permit more economical handling of steel.

An instance of this centralization is provided by the growing concentration of warehouses at several New Jersey points in recent years. Many of these operators formerly maintained plants solely in New York city. Steadily rising freight rates and increasing competition from new warehouses at outlying points are important factors in this trend.

Standard Services—The warehouses do more than just stock steel for the small buyer. The producing mills turn out products in standard lengths and widths, but the distributors go further in this direction, cutting steel to any size and shape desired, shearing and sawing structurals, bars, and bar shapes, slitting and shearing sheets, and flame-cutting plates to irregular shapes.

These are standard services offered by many firms and more of them are installing shearing, slitting, sawing and cutting equipment as the need for such services increases, broadening the service opportunity for the warehouse operator. Additional services in the way of bending and forming are also offered by some distributors, and a few of them are in position to offer pickling, heat-treating and other processing.

Staffed with specialists, many warehouses advise customers in the selection, application and fabrication of steel in its various forms. Such counseling has contributed substantially to the successful operation of many customers. On several occasions over recent years the distributors have pioneered in introducing new types of steel to the consuming trade.

Easier Supply Coming — No one knows when steel supply-demand balance will be achieved. Some think it will begin to show up late this year. For some months past warehouse stocks, though still highly unbalanced and far from normal, have been rising steadily and this is seen as a harbinger of coming plenty. It is giving rise to the question: Will the warehouses be prepared for the new selling conditions bound to accompany return of a buyer's market?

Only time will answer that question, but there is no doubt that supplies will be easier for the warehouses to obtain. To what extent will warehouse volume be affected when the mills can take care of about everyone that comes to them for tonnage? Mr. Doxsey says there are three ways for the warehouses to maintain their volume at profitable levels:

1—More people must be persuaded to make more products of steel and to use it more generously in construction of homes, buildings, bridges, etc. Much of the market lost by steel to substitutes can be recovered through aggressive sales effort. New fields of application must be developed.

2—Too many steel consumers are carrying too much steel in inventory instead of depending upon their nearby warehouses. These must be educated to the fact such stockpiling is costly and wholly unnecessary, especially with steel in plentiful supply.

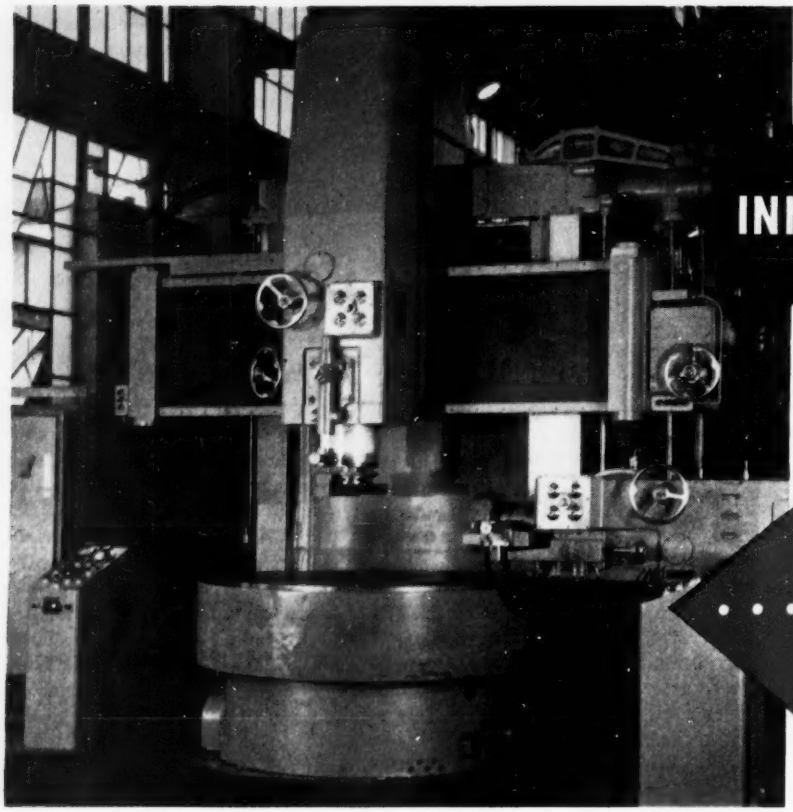
3—The third area for enlarged activity lies between the recognized warehouse order and the one that belongs to the mills. Since 1939 the average size of warehouse orders has increased fourfold due to supply shortages, mill delivery dates and urgency of needs. Between what may be the smallest unit a mill can roll without excessive cost and the minimum quantity it can sell economically lies a promising field for broad warehouse service.

Must Keep Pace — By making plus-service available, the warehouses have risen in stature over recent years. But they cannot rest on their past record. They must keep pace with the growing economy, expanding and adjusting their facilities and services to conform with the ever-changing demands of fickle buyers. If success is to attend their efforts they will have to be alert for new conceptions of stocking, handling and shipping steel, and most of all, must be quick to effect the most modern merchandising methods and policies. If they do this, trade leaders say, the warehouse industry will successfully meet the challenge of the future.

INDUSTRIAL STEEL PRODUCTS SHIPPED TO WAREHOUSES

(Net Tons)

Product	1946	1947	1948	1949	1950	1951	1952
Shapes	785,498	853,016	772,815	677,300	787,908	907,482	905,440
Plates	696,861	904,430	822,149	645,194	863,692	1,062,200	1,171,118
H-R Bars	944,063	1,145,432	1,100,931	929,034	1,033,989	1,100,807	1,137,646
C-F Bars	470,745	439,004	389,044	278,380	351,970	420,880	451,360
H-R Sheets	779,605	834,700	824,023	660,444	942,879	1,069,511	860,416
C-R Sheets	424,907	427,389	516,273	557,615	847,152	904,404	946,304
Gal. Sheets	440,457	440,021	481,266	623,897	890,368	745,146	833,463
Mech. & Press Tubing	127,267	166,573	226,559	161,457	179,569	240,226	247,692
H-R Strip	107,433	127,401	142,873	123,553	129,581	178,567	179,158
C-R Strip	41,250	42,208	91,343	78,334	96,711	101,856	76,813
All Alloys	225,266	218,213	329,996	238,133	306,563	390,930	412,780
All Stainless	57,326	53,364	75,101	51,533	108,320	126,364	128,202
Total	5,100,679	5,651,751	5,772,373	5,024,874	6,538,702	7,248,393	7,350,592



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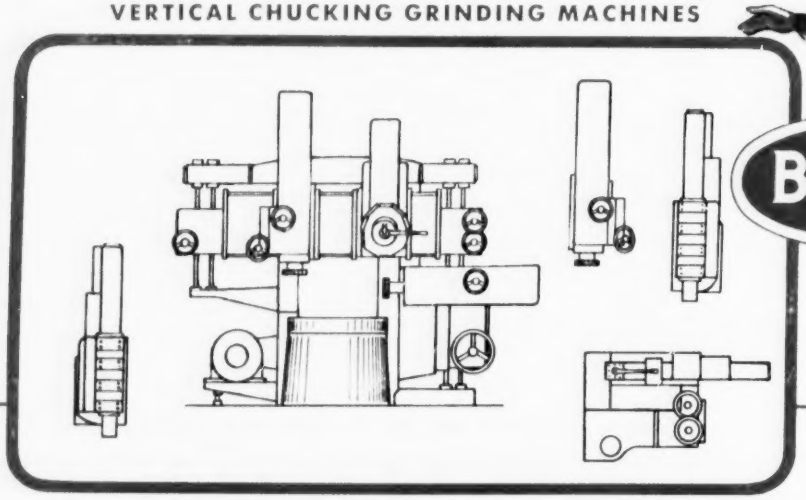
POSSIBLE HEAD COMBINATIONS on BULLARD VERTICAL CHUCKING GRINDING MACHINES

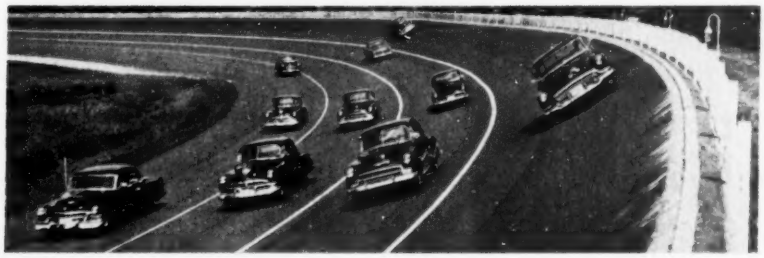


THE BULLARD COMPANY

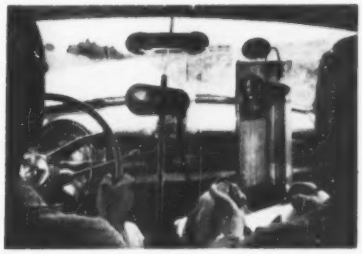
BRIDGEPORT 2, CONNECTICUT

By FLOYD G. LAWRENCE *Detroit Editor*

Mirrors of Motordom



On the manufacturer's test track new cars prove their merits, bugs are revealed



Tests for speed, acceleration and fuel economy are made during the run at intervals of several thousand miles

A big reason for that smooth ride and dependable performance in your late-model car is the proving ground where test drivers try to be more average than average

DETROIT

IN DAYS not too long past, the instruction book supplied with the American automobile covered everything up to and including complete dismantlement, with a hint that the dealer might be called upon to supply the needed parts.

But the instruction book which accompanies the modern auto is a strange publication indeed, as one writer points out.

Instructive? — This booklet in the glove compartment of the new car may be labeled "Instruction Book" unless it is called something spicier such as "Miles of Smiles in Your Fishtail Eight." But the instructions it contains go something like this: 1. Heady praise of your general intelligence and morals for selecting the Fishtail Eight with an implication that nothing will ever go wrong with it; 2. a categorical warning that if anything ever does go wrong with it you had better see your dealer or the factory can assume no responsibility for the awesome consequences; and 3. exquisitely detailed information on how to remove spots from the upholstery.

The interesting thing about this apparent scorn of the modern man's mechanical aptitude is that the modern instruction book contains just about what it needs to contain. A remarkably high percentage of today's automobiles will run through their first several owners with nothing more serious than spots on the upholstery to repair. Engineering and manufacturing traditionally get all of the glory for this amazing ability of the modern car to withstand the foibles of Harry Horsepower and his little woman, but a factor often overlooked is the proving ground.

More Average Than Average— Most people think of a proving ground as a place where courageous men in helmets perform feats somewhat intermediate between an auto thrill circus and stock car races. Actually, if you are willing to drive eight hours a day, carefully following instructions, chances are good you could drive at a proving ground. For the secret of success at a proving ground is to out average-drive the average driver.

A typical part to be tested might be a fuel pump. Engineers have designed it utilizing all the principles of science and previous experience at their command. But as one proving ground official commented, "Nothing has ever worked perfectly just as it came off the drawing board. There is something to be corrected in 100 per cent of the components a proving ground tests."

Test the Test—This statement is the more remarkable when it is realized that before an item is released to the proving ground it has already undergone extensive laboratory testing. But the automobile is a complex mechanism and a given component not only has to do its own job well under all conceivable circumstances, but it also must get along well with its neighbors. Vibrations and heat may arise that had not been anticipated. Clearances may prove inadequate in service due to dust particles or expansion of a neighboring part.

General Motors

After thorough testing, new cars are completely torn down. All moving parts are carefully checked for wear

So several models of the designed and laboratory tested fuel pump are made up and turned over to the proving ground. The pumps are tested on racing engines in cold weather and idling engines in hot weather. They are tested going up hill and down hill and at varying speeds on all types of road surface. They are pelted with water and smothered with dust. They are tested with

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all types of fuel and under all types of load by leadfoots and lightfoots.

The Reason Why — Then the proving ground writes its report. It may be a report to an outside manufacturer who is trying to sell the company his product, and if the product has merit the auto firm will work with him to finalize development. If it's a report within the organization, engineers and laboratory men will try to figure out what caused the failures reported and set to work solving the trouble. When the trouble is remedied, back to the proving ground go new models of the fuel pump to undergo more testing to be sure that the elimination of one bug hasn't given rise to others.

Once in a while, in an effort to make a forthcoming model with a new feature, testing is not complete. Occasionally, too, an item will pass all tests with flying colors but when it goes into production bugs suddenly appear that were not present in test models.

Police—This gives rise to the second phase of the testing program. Not only is the proving ground an engineering policeman, it also polices manufacturing. Periodically cars are purchased from dealers just as a customer would buy them and back to the proving ground they go.

Perhaps a rattle will develop and a worker tightening screws haphazardly in Gemus assembly is tapped on the shoulder and appraised of his sins. Perhaps a body creak shows up indicating that more welding spots are required at a given assembly point or the engine may start to use oil, indicating poor material in the main bearings supplied by an outside firm. Whatever the trouble may be, the word is passed down the assembly line and the trouble is corrected. For this reason, cars built later in the model year are often a better purchase than the first editions right off the presses when models change.

Better and Better — But the techniques of the proving ground grow better every year. Through copious files of customer complaints, they are learning more about the incredible driving habits of the few. Better instrumentation and improved testing devices are continually being devised to help locate weak spots and accelerate wear. Variables are being more adequtely controlled so that the sources of trouble can be more readily located.

At Chrysler, for example, a recent development is a giant circular grinder to smooth tires perfectly so that tire noise will not be a factor in evaluating the noise level of the car itself. At General Motors, a recent development is a steering torque measurement device which plots input effort against movement of output at the wheels.

In the last analysis, however, it is the driving like yours or Harry Horsepower's that constitutes the acid test. The proving ground group of professional customers which points its finger at engineering and manufacturing for you is a major factor in the simplicity of the modern instruction book and the reliability which warrants it.

Auto, Truck Output
U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,478
July		226,134
August		322,755
September		595,715
October		656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
June 6	134,619	128,837
June 13	166,832	130,574
June 20	169,031	129,353
June 27	173,702	124,370
July 4	138,447	86,052
July 11	161,000*	70,592

Sources: Ward's Automotive Reports.
*Estimated by STEEL

Car of the Week

A week spent driving a Capri reveals that the Lincoln combines the fine performance of its namesake president with the personality of a wildcat. At speeds well in excess of four score and seven mph, the Lincoln smoothness and road-holding characteristics are superb. This car cruises down the road at 70 mph with a greater sense of security than some cars manifest at 50 and it is difficult for the newcomer to believe that the speedometer hasn't taken leave of its senses.

With torque of 305 foot-pounds at 2300 rpm, tramping the accelerator of a Lincoln is like releasing a coiled spring. In a friendly drag with a competitor product of some repute in the accelerating department, the Lincoln peeled rubber for upwards of 100 feet in Hydramatic low range. The car's Jaguar-type ball joint front suspension coupled with the torque of the Lincoln engine gives this car a nimbleness around town and on the open road that is difficult to believe in a car of this size. Passing kick-down on the open road is almost unnecessary.

Visibility is excellent to the front, good to the rear though the rear fenders cannot be seen. Body roll in cornering is moderately severe yet never appears to get out of hand and the Lincoln will stay with many cars more touted in that department. Ride was strikingly good particularly in view of the fine handling and roadability characteristics of the car normally associated with more firm suspension.

Power steering seems essential if a woman is to drive the car often. Turning the wheel while parking took appreciable effort, though the steering ratio is no more sensitive than most on the open road. Interiors are well done and general workmanship is good. The instrument panel sacrifices somewhat in convenience for style with knobs distributed somewhat sparsely around an expansive periphery. The main instruments are well grouped for at-a-glance reading at near eye level and the eyebrow above them prevents reflection into the windshield both during day and night driving.

The Lincoln is comfortable, it's luxurious, it's sure-footed and it goes as if it's jet propelled. Little else can be said about any car.

Off the Envelope Back

Chevrolet has completed the biggest first six months in its history; Buick the biggest six months in its history.

STANDARD STRUCTURAL ALLOY • BEARING QUALITY
ALLOY TOOL • SPECIALTY • NITRALLOY • CARBON
TOOL • AIRCRAFT QUALITY

Hot Rolled • Forged • Annealed • Heat Treated • Normalized
Straightened • Cold Drawn • Machine Turned • Centerless Ground

SELL YOUR SCRAP!

COPPERWELD STEEL COMPANY
WARREN, OHIO

117 Liberty Street
New York, New York

1140 Lockwood Drive
Houston 20, Texas

176 W. Adams Street
Chicago, Illinois

528 Fisher Building
Detroit, Michigan

P. O. Box 1633
Tulsa, Oklahoma

3104 Smith Tower
Seattle, Washington

1578 Union Commerce Bldg.
Cleveland, Ohio

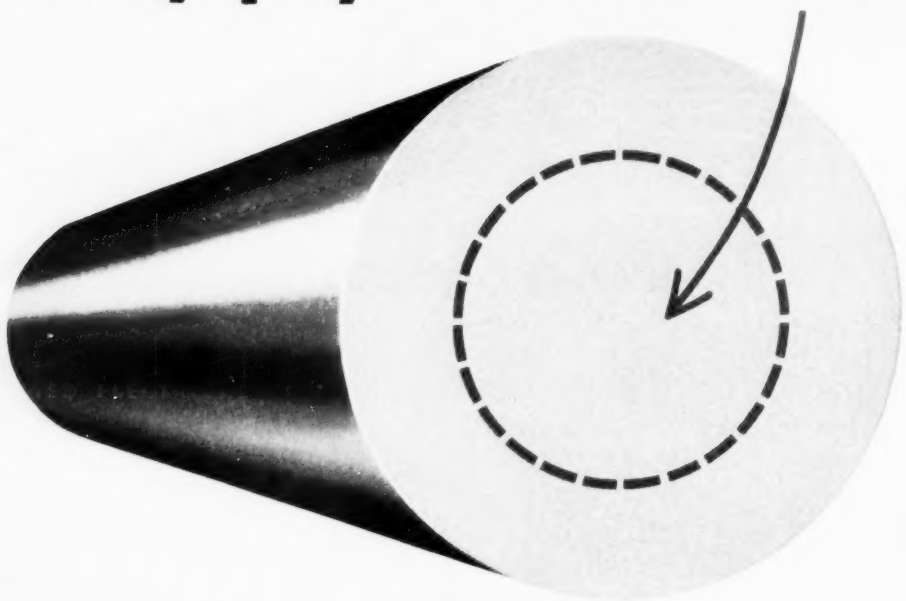
Monadnock Building
San Francisco 5, Calif.

7251 General Motors Bldg.
Detroit, Michigan

803 Loew Building
Syracuse, New York

325 W. 17th Street
Los Angeles 15, Calif.

Why pay for this waste...



when you make hollow parts?

THE center hole's already in Timken® seamless tubing. There's far less metal to machine away, far less waste. You save machining time—get more parts per ton of steel.

With Timken seamless steel tubing, finish boring is often the first production step. Screw machine stations can be released for other operations, giving you added machine capacity without additional machines.

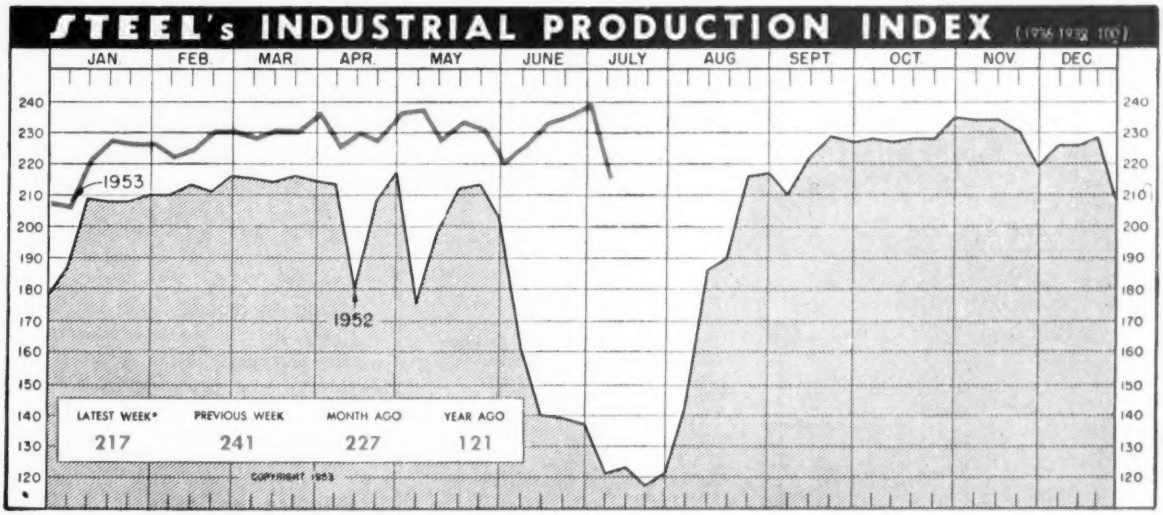
To save you even *more* steel, the Timken Company's engineers will study your problem and recommend the most economical tube size for your hollow parts job—guaranteed to clean up to your dimensions.

Timken seamless tubing gives you high internal quality because the piercing process by which it is made is basically a forging operation. It has a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal. And the Timken Company's rigid quality control keeps this quality uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

The Business Trend



*Week ended July 4

Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%

Industrial production fizzles during the week of the "victorious fourth." But watch for output to surpass the record height of the previous week as automobile schedules rise

WITH AMERICANS taking time out to commemorate their independence and enjoy its fruits, industrial production in the week ended July 4, slowed down momentarily.

As output suffered its greatest weekly decline of the year, STEEL's industrial production index plunged to 217 per cent of the 1936-1939 average. All the component factors of STEEL's index were stymied by the holiday celebration.

During the previous week, however, Americans renewed their lease on freedom. A new industrial production record was established as electric output and automobile outturn paced the index to a high of 241 per cent.

Structural Weakness . . .

Although the demand for steel continues on a high level flaws in the structure of its demand are exerting greater force. The cutback in government orders has resulted in greater inventories of steel for some defense manufacturers. And some automobile producers have accumulated larger stocks of steel as a result of the now-ended strike at the transmission plant of Borg-Warner Corp.

Moreover, the decline in farm income has meant reduced sales for makers of farm machinery. And the failure of consumer demand, in general, to reach expectations has caused a downward trend in sales of electrical appliances and has probably brought about the closing of the cabinet unit and food freezer division of the General Electric Co., located in Erie, Pa.

Crosscurrents . . .

The present high level of steel production enabled shippers of iron ore to set a record during the previous month. Traffic in June broke all former records for the month as shipments of iron ore totaled 13,744,894 gross tons, the Lake Superior Iron Ore Association reports. . . During the week ended July 11, furnaces poured 2,132,000 tons of steel ingots and castings, the American Iron & Steel Institute estimates. . . Orders for new equipment decreased for the second consecutive month, according to the Foundry Equipment Manufacturers Association. . . Shipments of ferrous castings increased from March to April. April's total was 1.55 million net tons, says the Bureau of the Census.

Scheduling Records . . .

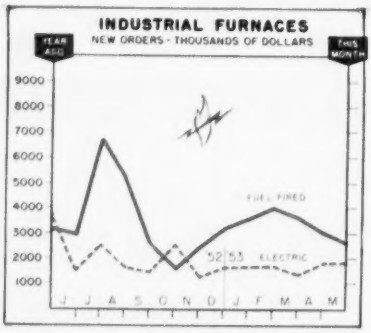
The holiday dealt a heavy blow to automobile production. During the week ended July 4, the combined output of plants in the U. S. and Canada fell 21 per cent, to 138,447 units, according to *Ward's Automotive Reports*. Production will rise sharply, however, as the automotive industry has set a July goal of 628,100 cars. The attainment of this goal will net a monthly high not achieved since October, 1950. And a sizable part of this production will be caused by larger truck outturn.

In order to recoup strike setbacks, truck manufacturers have scheduled 116,000 completions for July. With the realization of this program the best July output in 16 years would be written into the record books. This ambitious programming was scheduled even though one major automobile producer had adjusted production to market conditions.

The fizzle of the usual July 4 car sales boom this year may presage a general readjustment.

Weathering Adversity . . .

On the heels of record breaking electrical output, coal pro-

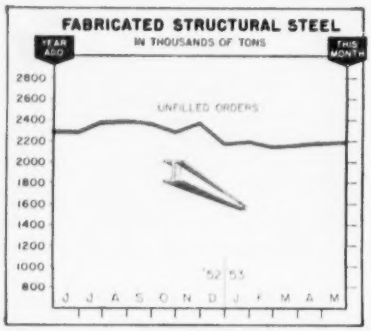


Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1953	1952	1953	1952
Jan.	3,540	3,379	1,655	2,856
Feb.	3,996	2,413	1,672	1,363
Mar.	3,607	1,813	1,301	2,100
Apr.	3,017	3,606	1,796	2,298
May	2,609	3,032	1,799	3,713
June	....	2,954	....	1,552
July	....	6,728	....	2,530
Aug.	....	5,259	....	1,626
Sept.	....	2,462	....	1,412
Oct.	....	1,507	....	2,459
Nov.	....	2,3 2	....	1,241
Dec.	....	3,235	....	1,634

*Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

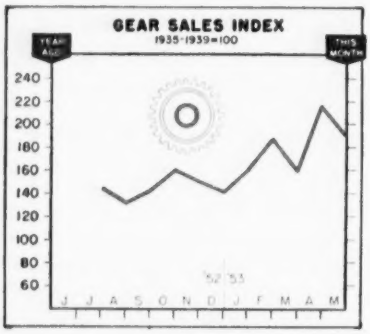


Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlogs	
	1953	1952	1953	1952
Jan.	241.4	244.9	2,180	2,416
Feb.	251.1	246.4	2,128	2,408
Mar.	266.3	268.8	2,155	2,501
Apr.	262.7	230.7	2,168	2,350
May	265.0	244.2	2,179	2,263
June	....	125.5	....	2,261
July	....	138.3	....	2,361
Aug.	....	226.3	....	2,363
Sept.	....	227.6	....	2,342
Oct.	....	261.7	....	2,266
Nov.	....	222.6	....	2,357
Dec.	....	225.2	....	2,153
Total	....	2,664.3		

American Institute of Steel Construction

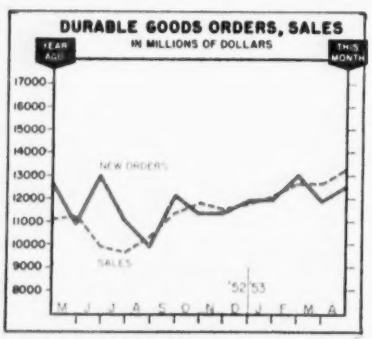


Gear Sales Index

(1947-1949=100)

	1953	1952	1951
Jan.	161.4	670.6*	764.6*
Feb.	188.1	539.5*	809.1*
Mar.	158.9	517.1*	830.7*
Apr.	217.1	478.7*	742.5*
May	189.8	425.9*	667.1*
June	....	452.3*	800.9*
July	....	145.3	589.1*
Aug.	....	132.3	564.2*
Sept.	....	143.4	630.0*
Oct.	....	160.8	703.4*
Nov.	....	150.9	530.0*
Dec.	....	140.9	716.5*

*(1935-1939=100)
American Gear Mfrs. Assn.



Durable Goods Orders, Sales

In Millions of Dollars*

	New Orders		Sales	
	1953	1952	1953	1952
Jan.	12,080	11,142	12,195	10,861
Feb.	13,138	11,519	12,828	11,352
Mar.	12,023	12,171	12,821	10,632
Apr.	12,678	12,443	13,397	11,310
May	....	10,956	....	11,328
June	....	13,138	....	10,060
July	....	11,140	....	9,777
Aug.	....	9,998	....	10,437
Sept.	....	12,328	....	11,510
Oct.	....	11,452	....	11,968
Nov.	....	11,441	....	11,676
Dec.	....	12,011	....	11,913

*Seasonally adjusted. U. S. Bureau of Business Economics

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Issue Dates on other FACTS and FIGURES Published by STEEL

Construction ..... July 6	Machine Tools ... July 6	Refrigerators .... May 18
Employ., Metalwk. July 6	Malleable Castings June 8	Steel Castings .... June 8
Employ., Steel .... June 1	Prices, Consumer.. June 22	Steel Forgings .... June 8
Foundry Equip. ... June 1	Prices, Wholesale .. June 1	Steel Shipments ... June 22
Freight cars ..... June 15	Pumps ..... June 1	Vacuum Cleaners .. June 29
Gray Iron Castings June 8	Radio, TV ..... May 25	Wages, Metalwk. ... July 6
Indus. Production. June 22	Ranges, Elec. ..... Apr. 13	Washers ..... June 29
Ironers ..... June 29	Ranges, Gas ..... May 18	Water Heaters ... June 29

duction in the week ended June 27 totaled 10,050,000 net tons, the National Coal Association says. Bituminous coal has been mined in ever increasing quantity for several weeks and present levels are considerably above those attained during the corresponding periods in 1952. The increasing use of electricity has really saved the day for coal since exports of the fuel suffered a heavy decline in the first half of the year. During the first six months of 1953, coal dumpings at Hampton Roads dropped 45.7 per cent while European nations were increasing the gold and dollar reserves and the European Coal & Steel Authority was commencing to exercise its recently granted jurisdictional functions.

Bringing the Goods . . .

Loadings of railroad revenue freight in the week ended June 27 continued to rise. A total of 818,450 cars were loaded, the Association of American Railroads reports. Inter-city truck tonnage transported by motor carriers in the first quarter of 1953 shows an even more striking increase. A new high for the period of 283 per cent, (1941=100), was set, according to the index compiled by the American Trucking Associations. All of the regions in the U. S. participated in the gain and the only commodity group not showing an increase was household goods carriers.

Changing Sources . . .

New money financing of business and government increased in volume more during the first half of 1953 than in any other half year period since World War II, says the Federal Reserve Bank. Total intermediate and long term capital raised by these groups amounted to $11 billion, not including money used to retire other debts. During the same period in 1952 demands of business and government for capital were $1.5 billion less.

In recent weeks, however, business has been exhibiting a new attitude. Almost all segments of business have been decreasing their indebtedness at a time when

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	96.0	99.0	12.5
Electric Power Distributed (million kwhr)	7,970	8,446	6,478
Bituminous Coal Output (daily av.—1000 tons)	1,615	1,644	1,399
Petroleum Production (daily av.—1000 bbl)	6,489[1]	6,484	6,102
Construction Volume (ENR—millions)	$256.2	$484.4	$223.2
Automobile, Truck Output (Ward's—units)	138,447	173,702	86,052
TRADE			
Freight Car Loadings (unit—1000 cars)	600[1]	818	447
Business Failures (Dun & Bradstreet, number)	169	195	131
Currency in Circulation (millions)[3]	$30,152	$29,929	$29,180
Dept. Store Sales (changes from year ago)[3]	+3%	+13%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,578	$19,008	$21,391
Federal Gross Debt (billions)	$266.1	$266.6	$259.2
Bond Volume, NYSE (millions)	$13.1	$14.1	$13.2
Stocks Sales, NYSE (thousands of shares)	4,386	5,121	5,303
Loans and Investments (billions)[4]	$76.1	$76.6	$75.4
United States Gov't. Obligations Held (billions)[4]	$29.2	$29.5	$32.5
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	189.18	187.73	171.92
STEEL's Nonferrous Metal Price Index[6]	224.7	224.7	224.6
All Commodities[7]	109.4	109.6	111.2
All Commodities Other Than Farm and Foods[7]	114.1	114.0	112.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1953, 2,254,459; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

banks have more to lend. Preparations for future conditions and expectation of a change within a short period of time in the excess profits law evidently account for the change. New security issues appear to be increasing with the proceeds of these issues being used to repay the banks.

Confidence Needed . . .

The outstanding short term indebtedness of consumers reached a new high of $26.7 billion in May. Automobile financing continues to account for about 60 per cent of this debt, according to the Federal Reserve Bank. Of greater interest than the magnitude of the loans is the fact that consumers are borrowing at about the same rate that they did in the comparative 1952 period. And during 1952 consumers were able to increase their savings rate. It would appear, then, that consumers could spend considerably more if they wished to do so. Were the public to continue spending at the first quarter rate, which was the highest in history, inventories would be reduced sharply.

Smaller Slice . . .

Since World War II the share of retail trade transacted by department stores has fallen substantially. This is due to no failure on the part of department stores to keep pace with their competitors but rather to a disproportionate growth of sales by noncompetitive outlets. Department stores received 8.3 per cent of the retail sales dollar in 1945; now they get about 6.3 per cent, says the National Industrial Conference Board. Nevertheless department stores participated to a sizable extent in the first quarter sales boom, as their sales increased about 5 per cent during the first half of the year as compared with the same half in 1952. At the present time new orders are 8 per cent above year ago levels, the Federal Reserve Bank reports.

Trends Fore and Aft . . .

Primary price index for all commodities other than farm and foods moved up to 114.1 per cent during the week ended June 30 . . . New business incorporations dropped for the second consecutive month, as only 8,968 businesses were organized during May . . . In May idleness from labor disputes increased to 3 million man days, from an April total of 2.5 million man days . . . Television set production during the first five months topped all previous comparative periods.

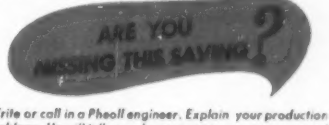
Countless small parts usually made by conventional turning processes — by stamping, drawing, casting or molding — can be made *better . . . stronger . . . cheaper* by *cold-heading* and roll threading.

Machining of Cold-Headed Parts is hardly ever necessary because shank and head dimensions can be held to very close tolerances. Rolled threads are produced to American Standard dimensions.

Here are just a few of the many parts formed or roll threaded . . .

Screws	Plastic Inserts	Stems
Bolts	Thumb Screws	Arms
Studs	Wing Nuts	Plugs
Rivets	Small Gears	Prongs
Rods	Tongue—Clevis	Points
Links	Segments	Hooks

Single or multiple secondary operations can be performed on cold-headed parts to produce special characteristics required to fit the part for its particular application. These secondary operations include drilling, tapping, milling, shaving, flattening, notching, flanging, trimming, serrating, bending, off-setting, slotting, fluting, swaging, knurling, pointing, heat treating, plating and finishing.



Write or call in a Pheoll engineer. Explain your production problems. He will tell you where you can save money, speed production, improve your product appearance.

PHEOLL SCREWS BOLTS NUTS

FASTEST THING IN FASTENINGS®

TINNERMAN

Speed Nut

SAVINGS STORIES

View of
Cap Type Push-On SPEED NUTS
on Bearing Hanger Hook

"Swings" to Tinnerman SPEED NUT® Cuts Production Costs 60%!

This Tinnerman SPEED NUT brand fastener helped Engineers at Eastern Pipe Supply Company, Philadelphia 22, Pennsylvania, solve a fastening problem and substantially reduce assembly costs.

In their own words, here's what happened: "Your Cap type SPEED NUT, used in conjunction with our special swivel-proof bearing hanger hooks has been a terrific sales attribute. In addition to affording our 'Safe-Play' Gym Sets a streamlined appearance it has cut our production costs by 60%.

We are extremely gratified with the performance of Tinnerman SPEED NUTS and will continue applying them to our products wherever possible."

No matter what fastening problems you may have on your products, the Tinnerman representative can help your engineers solve them. See him soon for full information on our Free, Fastening Analysis service designed to save your production dollars.

TINNERMAN CAP TYPE PUSH-ON SPEED NUT FASTENER

This is a special Push-On type SPEED NUT. Two are used for each hanger hook attachment. They zip over the unthreaded ends of the bearing hanger itself, holding hook to bearing, and hanger to swing frame. Spring steel prongs bite-lock, give rigid, vibration-proof fastenings; eliminating materials and materials handling.

Send for your "SAVINGS STORIES" booklet of interesting SPEED NUT savings to industry. Write today: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners, Ltd., Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S. A. – 7 rue Henri Barbusse, Levallois (Seine).

TINNERMAN Speed Nuts®

MORE THAN 8000 SHAPES AND SIZES

Men of Industry

ROBERT W. DAUMILLER
. . . Townsend Co. purchasing agent

CHRISTOPHER D. NORTON
. . . v. p. of two Acme Steel subsidiaries

M. J. HOKE
. . . gen. mgr., Ohio Crankshaft div.

Townsend Co., New Brighton, Pa., appointed **Robert W. Daumiller** purchasing agent. He succeeds **W. W. Rinehart** who retires after serving in that position for the last 16 years. Mr. Daumiller joined Townsend in 1946 and last year was made assistant purchasing agent.

Vocaline Co. of America Inc., Old Saybrook, Conn., appointed **Edward F. Nash** as supervisor of quality control for the test and inspection department of its Bristol Motor Division. He was formerly with Norden Instrument Co.

Hardinge Co. Inc., York, Pa., elected **John J. Cadot** executive vice president and **Robert J. Russell** vice president in charge of sales. Mr. Cadot continues as treasurer and works manager and Mr. Russell remains corporation secretary and sales manager.

W. S. Rheem II was promoted to assistant general manager, **Rheem Mfg. Co.**, with headquarters at the South Gate, Calif., plant. He is succeeded by **E. C. Bergen** as western division manager. Mr. Bergen was regional manager at Richmond.

Willard F. Goertz was named sales manager, **Axelson Mfg. Co.**, Los Angeles, division of Pressed Steel Car Co. Inc. He has been with the company since 1927.

Christopher D. Norton was elected vice president of Acme Steel International Co. and Acme Steel Overseas Co., Chicago. Both organizations are subsidiaries of **Acme Steel Co.** Mr. Norton, also a director of the parent company, will be concerned with further expansion of Acme Steel's foreign sales operations.

Richard W. Boebel was elected president, **Wales-Strippit Corp.**, North Tonawanda, N. Y., to succeed **Walter P. Hooper,** who remains on the board. Mr. Boebel, who joined the company in 1951, was recently made executive vice president.

Charles K. Munn, treasurer, **Edgcomb Steel Corp.,** Hillside, N. J., was elected vice president and treasurer. With the company for 26 years, he was at one time sales manager.

Richard S. Newlin, a director and vice president, was elected president of **Inspiration Consolidated Copper Co.**, New York, to fill a vacancy created by the death of **William D. Thornton.**

Charles E. Reiter was appointed manager of **Republic Steel Corp.'s** general order department, Cleveland, to succeed **R. J. Morgan,** retired. Mr. Reiter was assistant manager.

M. J. Hoke was appointed general manager of **Ohio Crankshaft Co.'s** crankshaft and camshaft division, Cleveland. He joined the company in 1945 as a development engineer. In 1947 he became chief engineer and the following year works manager.

Edgcomb Steel of New England Inc., Nashua, N. H., appointed **George B. Goodwin** sales manager. He was formerly general manager of Zurbach Steel of Southington, Conn., and prior to that was with the New York office of Republic Steel Corp.

Charles F. Horne, Rear Adm. USN (ret.), was named manager of **Consolidated Vultee Aircraft Corp.'s** Pomona, Calif., division, effective July 15. Adm. Horne, presently engaged as an electronics and aviation consultant to several companies and organizations, will succeed **Gage Irving,** who resigned several months ago. In the interim, **J. V. Naish,** Convair executive vice president, assumed the division managership in addition to his other duties.

Cecil W. Farrar rejoined **W. A. Case & Son Mfg. Co.**, Buffalo, as administrative officer in charge of promotional sales and advertising. He has been vice president in charge of sales of Richmond Radi-

VICTOR P. GEFFINE
. . . heads two companies

G. L. SMITH
. . . gen. sales mgr. at Republic Rubber

A. DONALD MEAD
. . . joins Mechanical Handling Systems

ator Co. in New York for the last nine years.

Cliffs Power & Light Co., Ishpeming, Mich., elected **Victor P. Geffine** president. He resigns from the office of senior vice president, Cleveland-Cliffs Iron Co., to devote a considerable portion of his time to the power program necessitated by Cleveland-Cliffs' development of jasper beneficiation on the Marquette range. Mr. Geffine also becomes president of **Newfoundland & Labrador Corp. Ltd.** succeeding **C. A. Pippy**, and takes up residence in St. Johns, N. F.

Victor A. Olsen, who retired in 1952 as general manger, Detroit Transmission Division, General Motors Corp., has become active as an executive consultant to **Hupp Corp.**, Cleveland, and for its subsidiary, Amgears Inc., Chicago.

G. L. Smith, former sales manager, was advanced to general sales manager, **Republic Rubber Division**, Lee Rubber & Tire Corp., Youngstown.

Empire Brass Mfg. Co. Ltd. appointed **J. E. Gibson** manager of the Hamilton, Ont., branch to succeed **W. C. Hawe** who was appointed branch manager of Thos. Robertson & Co. Ltd., Montreal.

Hansell-Elcock Co., Chicago, appointed **S. C. Massari** manager of its gray iron foundry division. Prior to joining the firm he served for five years as technical director of American Foundrymen's Society.

Sharon Steel Corp. appointed **E. Thomas Erdmann Jr.** as a sales representative at Indianapolis.

A. Donald Mead, former supervisor of plant layout engineering for Lincoln-Mercury Division, Ford Motor Co., joined **Mechanical Handling Systems Inc.** as sales engineer.

J. Carlton Ward Jr. was elected president of **Vitro Mfg. Co.**, **Vitro Corp. of America** and **Vitro Chemical Co.**, New York, to succeed the late **Albert L. Baker. Charles S. Payson** was elected chairman of the boards of directors of the three companies. Mr. Ward was president and later chairman of Fairchild Engine & Airplane Corp. during the 1940's. From 1949 to 1953 he has been chairman of the board of Thompson Industries Inc., Boston, and has been engaged as a business consultant.

Robert S. Dunseath was appointed sales manager of roofing and siding in New Jersey for **Plasteel Products Corp.**, Pittsburgh.

William R. Holmes succeeds **Edwin J. Heffner** as manager of the Cleveland district of **United States Steel Supply Division**, U. S. Steel Corp. **Joseph J. Codd** was made Baltimore district manager and is succeeded by **William G. Thornton** as sales office manager in Baltimore.

Russel T. Drennan and **Joseph A. Voss Jr.** were appointed, respectively, eastern sales manager and assistant eastern sales manager, chemical division, **Kaiser Aluminum & Chemical Sales Inc.**

Earl W. Diener was named eastern sales manager of **National Lead Co.'s** Titanium Pigment Corp., New York.

Beals, McCarthy & Rogers Inc., Buffalo, appointed **Elmer E. Hass** of Syracuse, N. Y., and **Donald M. Colmerauer** of Kane, Pa., as representatives in their territories for the company's steel and industrial supply operations. The two men succeed **R. R. Comstock**, retired.

Dean Richman was made manager, quality control department, **American Machine & Foundry Co.'s** Buffalo plant. He joined AMF last fall as assistant superintendent, manufacturing division. He now replaces **Edward W. Forth.**

W. H. Brady Co., Milwaukee, appointed **Westley J. Tuite** general sales manager; **Fred C. Kluhsman** Chicago district representative; **Joseph I. Stone** eastern district manager with headquarters at Newark, N. J.; and **Paul J. Leonard** mideastern district representative with headquarters at Philadelphia.

Philip I. Wolf was appointed sales engineer, **Research & Control Instruments Division**, North American Philips Co. Inc., Mt. Vernon, N. Y.

F. D. Lowell was promoted to sales manager, Rochester Products Division, **General Motors Corp.**, Rochester, N. Y.

F. E. Walker Jr. was made central-western district sales manager,

SYMBOL OF MATCHED EFFICIENCY FOR UNPARALLELED PERFORMANCE

The name FAWICK has become known throughout industry for its engineering, development and production of power transmission products . . . and, because of their outstanding contributions to industrial power transmission, FAWICK AIRFLEX CLUTCHES AND BRAKES have become literally a symbol of unparalleled performance.

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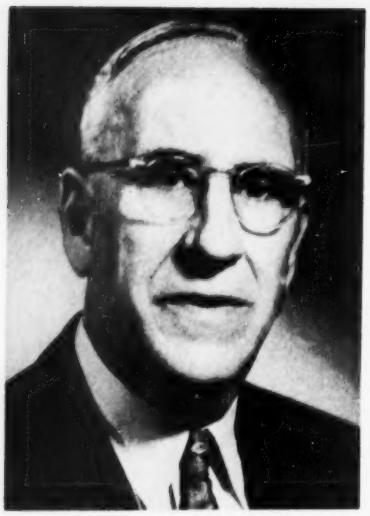

A. G. BISSELL
. . . consultant to Nelson Stud Welding

FRED J. WOOD
. . . Crown & Closure Div. v. p.-mfg.

Twin Coach Co., with headquarters in Kansas City, Mo.

A. G. Bissell, head civilian of the Welding, Casting & Forging Branch of the U. S. Navy's Bureau of Ships for 17 years prior to retirement June 1, was named engineering consultant to **Nelson Stud Welding Division,** Gregory Industries Inc. He moves from Washington to Seattle, and will function as a consultant on stud welding and engineering problems generally.

Braeburn Alloy Steel Corp., Braeburn, Pa., appointed **C. F. Monard** in charge of sales in the Connecticut area.

Clem H. Hohner was appointed manager of **Udylite Corp.'s** southeast sales district. He will be in charge of the warehouse and sales office now under construction in Atlanta.

Frank W. Wehrheim was appointed general sales manager, **Appleton Electric Co.**, Chicago. Since January, 1952, he has been sales manager, electrical fittings division. **Daniel C. Wing** was made sales engineer in the New England area.

Albert H. Borchardt, vice president of **Worthington Corp.**, Harrison, N. J., retired after 44 years' association with the company.

Truman L. Clapp retired as president of **Clapp & Poliak Inc.**, New York.

Fred J. Wood was elected vice president in charge of manufacturing for Crown & Closure Division, **Crown Cork & Seal Co. Inc.**, Baltimore. He has been associated with Rheem Mfg. Co. as regional manager with headquarters in Linden, N. J.

Warren A. Tipton was named general sales manager, mechanical goods division, **United States Rubber Co.**, New York, to succeed **Walter F. Spoerl,** retired.

Donald C. Starr was appointed secretary-comptroller, **Chemsteel Construction Co. Inc.**, Pittsburgh.

Richard W. Lyke was promoted to assistant plant engineer for the Niagara, N. Y., plant of **Hooker Electrochemical Co.**

Utica Drop Forge & Tool Corp., Utica, N. Y., appointed **Ronald A. Larsen** as manufacturers' representative to cover southern Texas and Louisiana.

Dodge Steel Co., Philadelphia, elected **Clarence Tolan Jr.** chairman of the board and **Chester S. Roberts** president.

Overly Mfg. Co., Greensburg, Pa., appointed **Malcolm E. Fischer** assistant sales manager.

Aermotor Co., Chicago, elected **William H. Hamilton** president to succeed **Daniel R. Scholes,** retired after 55 years with the company. Mr. Scholes continues as a director. **Melvin T. Jensen,** secretary-treasurer, was also elected a vice president, and **James R. Walsh** was elected second vice president.

Moffats Ltd., Weston, Ont., appointed **G. R. Curry** general works manager succeeding the late **L. K. Webber.** For many years Mr. Curry was associated with the aluminum industry, recently as works manager for Aluminum Goods Ltd.

Glen L. R. Baumhardt, since 1948 vice president in charge of sales-engineering departments at **Redmond Co. Inc.**, Owosso, Mich., was made director of purchases. **Harvey B. Wilgus** was promoted from division manager of special products to general sales manager, induction motor division. **Annas Laurent** succeeds Mr. Wilgus.

James M. Seymour was appointed sales manager based at the home office in Burbank, Calif., and **E. D. Wilgus** manager of the eastern division offices located in Scarsdale, N. Y., for **Aviation Developments Inc.**

Chester M. Surdyk was made controller of **Ford Motor Co.'s** Buffalo assembly plant to succeed **W. F. Reineking,** named controller of Ford's Long Beach, Calif., assembly plant.

Leonard Schmitz was appointed chief engineer of **Mechanical Handling Systems'** pre-engineered division, Detroit.

Charles F. Pearson was made advertising and sales promotion manager, **John Oster Mfg. Co.**, Racine, Wis.

Walter H. Zollinger, chief engineer, manufactured products, Bethlehem plant, **Bethlehem Steel Co.**, Bethlehem, Pa., retires after more than 36 years of service.

C. E. Magoon was appointed treasurer, **National Tube Division,** U. S. Steel Corp., Pittsburgh. He succeeds **H. J. Hirshman** who retires after 49 years' service with National Tube, 30 of which he has been treasurer. Mr. Hirshman remains in a consulting capacity.

Carl W. Sisco was appointed sales engineer for the Toledo, O., dis-

the switch is to STAINLESS-CLAD PLATES

for lower costs... extension of material supplies

More and more, economy-minded buyers are switching to Stainless-Clad Steel Plates as an effective means of extending supplies of critical materials and of beating the high cost of stainless steel.

They find that in numerous types of fabrication these plates give them all the advantages of stainless steel, including high resistance to corrosion—yet with considerable savings in material costs.

Stainless-Clad Plates made by Claymont are a composite of stainless steel permanently bonded to carbon or alloy steel plate. They're easy to fabricate; will not buckle, crack or peel under the severest forming operations. Stainless cladding may be of any specified percentage of total plate from 10% to 50%.

Other Claymont products include Flanged and Dished Heads, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

To order, write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

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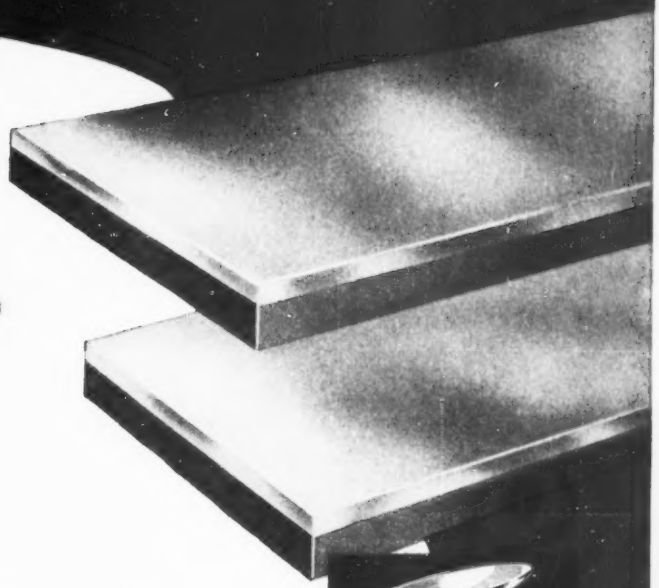
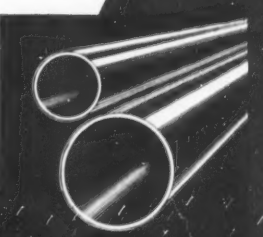
THE CALIFORNIA WIRE CLOTH CORPORATION—Oakland, California
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New York • Philadelphia
CANADIAN OFFICES: Toronto • Winnipeg • Edmonton • Vancouver



Flanged and Dished Heads

Carbon and Alloy Steel Plates



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PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
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Summerill has over 50 years experience in the manufacture and fabrication of cold drawn seamless steel specialty tubing. Our plant is completely equipped to produce tubing from the various carbon and alloy analyses in practically any special or intricate shape that you need. And you can count on us to adhere strictly to your specifications. ● Why not drop us a line today outlining *your* tubing problem? *Summerill Tubing Company Div., Columbia Steel and Shafting Company, Pgh. 30, Pa.*

"Miking" specialty tubing. Summerill Seamless Tubing is quality controlled from raw material to finished product.

IN COLD DRAWN SEAMLESS STEEL TUBING

SPECIFY *Summerill* AND BE *SURE!*

trict of the steel mill division, **Surface Combustion Corp.** He replaces **Frank J. Winder,** retired after 31 years of service with the company.

Robert H. Johnson succeeds **Robert L. Schwaegerle,** retired, as abrasive engineer in the eastern Iowa territory for **Norton Co.,** Worcester, Mass.

E. R. Cole was named manager of **Wheeling Corrugating Co.'s** new Houston branch located at 1100 East Holcombe Blvd.

George J. Finck was named New York district manager of **Bush Mfg. Co.** and **Heat-X-Changer Co.**

Ford L. Brooke was appointed New Orleans district manager by **Wickwire Spencer Steel Division,** Colorado Fuel & Iron Corp.

J. J. Merrill was appointed Boston division manager, **A. M. Byers Co.** He has been a field service engineer in the Chicago division.

Chrysler Corp., Detroit, appointed **E. M. Braden** director of regions for Chrysler Division and **Paul M. Ruef** to the executive sales staff of Dodge Division.

H. L. Ingram Jr. was appointed manager of the technical development department of **Air Reduction Sales Co.,** New York.

Gordon G. Hoit was elected executive vice president and **Charles W. Pritchard** treasurer of **Stromberg-Carlson Co.,** Rochester, N. Y.

Edward C. Polidor was elected a vice president, **Optical Gaging Products Inc.,** Rochester, N. Y.

Frank Warga was promoted to the new post of general foundry foreman, **AiResearch Mfg. Co.,** Los Angeles, in charge of the aluminum foundry at the main plant as well as the newly acquired steel foundry near South Pasadena.

John N. Wolfram, formerly staff engineer, was named to the new post of administrative engineer at **Parker Appliance Co.,** Cleveland.

PAUL F. VOIGHT JR.
. . . joins American Welding & Mfg.

Paul F. Voight Jr. was appointed special representative and merchandising consultant for **American Welding & Mfg. Co.,** Warren, O. Prior to joining American Welding, for which he will establish a new products division, Mr. Voight served in a similar capacity with Solar Aircraft Co. A veteran of the steel industry, Mr. Voight was manager of the stainless steel division of United States Steel Corp. from 1936 until his retirement in 1952. Prior to 1936, he had been vice president in charge of sales of Allegheny Steel Corp.

A. H. Honeck was made district manager in Cleveland and Cincinnati for **Graver Water Conditioning Co.**

George Copeland assumes managership of a new **Lukens Steel Co.** sales office opened in Richmond, Va.

Roy Rumbaugh was appointed director of sales engineering, **Klem Chemicals Inc.,** Dearborn, Mich.

A. M. Byers Co. appointed **R. G. Angell** manager of railroad sales with headquarters at its Philadelphia division offices.

RICHARD W. BANFIELD
. . . new position at P&W

Richard W. Banfield, vice president, succeeds **Charles M. Pond** as manager of **Pratt & Whitney Division's** small tool and gage division. Mr. Pond and **Hubert D. Tanner,** both vice presidents of P&W, division of Niles-Bement-Pond Co., West Hartford, Conn., have retired. Other appointments include: **Edward N. Clark,** superintendent, small tool division; **Harold G. Lucas,** superintendent, gage division; **William R. Back,** superintendent, aircraft parts manufacture. The latter three report to I. F. Holland, general superintendent, small tool and gage division. **A. L. Knapp** was made general superintendent, machinery division; **E. J. Ferris,** assistant general superintendent; and **E. J. Shages,** manufacturing superintendent. **Sandford G. Etherington Jr.** becomes supervisor of planning.

Adamas Carbide Corp. appointed **Raymond J. Nagy,** Simsbury, Conn., as its sales representative for Connecticut.

Dumas Steel Corp., Carnegie, Pa., appointed **Lawrence W. Schellhammer,** Indianapolis, as its sales representative in southwestern Ohio and northern Kentucky.

OBITUARIES . . .

Victor W. Peterson, 61, board chairman, **Hannifin Corp.,** Chicago, died July 1.

Robert E. Kochs, 48, district sales manager at Rochester, N. Y., for **American Pulley Co.,** died June 30.

Harry D. Wirth, 61, secretary-controller, **L. J. Mueller Furnace Co.,** Milwaukee, died June 30.

Lucian F. Adams, 58, auditor for **Dravo Corp.,** Pittsburgh, and its subsidiary, Fulton-Portsmouth Bridge Co., Portsmouth, O., died June 27.

Otto H. Anderson, 67, president, **National Steel Car Co.,** Hamilton, Ont., died June 28. He became president in 1952.

Molybdenum Output Soars

By 1954 Climax Molybdenum will be producing at a rate 90 per cent above that for 1952

FEDERAL government deserves a great share of the credit for the tremendous increase in capacity that made decontrol of molybdenum possible on June 30, says Arthur H. Bunker, president, Climax Molybdenum Co., New York.

"For the first time in two-and-one-half years American industry can now get all the molybdenum it needs," Mr. Bunker explained. "This is due to the tremendous expansion of our mining and milling facilities at Climax, Colo., which is now the largest underground metal mine in this country and the free world's chief source of molybdenum.

Expansion Continues—"As a result of that expansion, we are now producing at a rate two-thirds above that of 1952. By the beginning of next year, when further facilities come into production, the rate will be nearly 90 per cent above that of 1952.

"If officials of General Services Administration, Defense Materials Procurement Administration and Bureau of Mines had not had the foresight to support the present expansion and stockpiling program, the country would not be in its present favorable position with respect to this strategic metal."

Reserves at the mine in Colorado are now enormous. Even at current production levels the ore body of more than a quarter of a million tons will last about a half century.

Alloying Purposes—Bulk of the industry's output is alloyed with iron and steel, in which it raises hardenability and improves toughness. Such steels are widely used by almost all civilian industries and are essential for armor plate and guns. Molybdenum also increases the strength of many alloys at elevated temperatures. For this reason it is in increasing demand for use in jet engines.

Because the pure metal is the most readily available high-temperature material, melting at 4750° F, it holds great promise for future high-temperature applications. Molybdenum disulphide recently has been found to have valuable lubricating qualities, and various compounds also are used in pigments and in agriculture to enrich the soil.

Cross Gets Association Post

Milton O. Cross Jr., president, Cross Co., Detroit, machine tool manufacturer, was elected to the executive committee of the National Metal Trades Association, Chicago. He will act also as regional counselor in the Detroit area.

MILTON O. CROSS JR.

The association concentrates a major portion of its efforts on the promotion of industrial and human relations between employer and employees. It has rendered a particularly valuable service to the smaller companies, says Mr. Cross, by advancing the cause of good employer-employee relations and at the same time relieving these companies of the financial burden of maintaining their own individual human relations departments.

It has pioneered in the metal trades, he adds, in such projects as job evaluation, apprentice, foreman and safety training. Plans are under way for expanded and more intensive activity along these lines.

Butcher & Hart Mfg. To Move

Butcher & Hart Mfg. Co. will move to Altoona, Pa., from Toledo, O. The company will go into full production of lock washers, machine screws and retaining rings by July 27 at its new plant location.

Will Expand Magnesium Foundry

Aluminum Co. of America will erect a $300,000 addition to its magnesium foundry plant in Buffalo. The structure will have 33,000 sq ft and will be used for storage and laboratory space, as well as additional room for offices. Horace C. Cook, works manager, said the addition probably won't result in increased output.

Association Moves Offices

Automotive Parts Manufacturers Association moved to new quarters at 16219 Meyers, Detroit 35.

Melpar To Build Laboratory

Melpar Inc., electronic research firm, awarded a contract for construction of a building which will cost in excess of $4 million. It will house a research laboratory and will be located near Falls Church, Va. Melpar was purchased by Westinghouse Air Brake Co., Wilmerding, Pa., in 1951, and is now the research center for all the parent firm's divisions.

Many Workers with Seniority

More than 100 persons of the 500 employees of the Union Spring & Mfg. Co., New Kensington, Pa., have been with the company more than 25 years, says William McCabe, president. Mr. McCabe, himself, started with the firm 45 years ago.

Koppers Production Line Starts

Combination gun mounts and recoil mechanisms for 90 mm guns are coming off the production lines at Koppers Co. Inc.'s plant in Baltimore. They are being produced for Chrysler Corp.'s tank plant at Newark, Del. Permanent tooling for production of the Koppers-built equipment required almost a year despite high priorities. Specialized copying lathes, internal and external grinders and huge vertical hones were taken out of moth balls at government storage depots.

while other tools came directly from American and foreign machinery manufacturers. Koppers Baltimore plants also are producing machine gun cradle assemblies used in conjunction with the 90 mm mount, as well as steering, shifting, accelerator and braking controls for the Patton 48 tanks on which the guns are mounted.

Wilmot Castle To Build Plant

Wilmot Castle Co. will build a million dollar plant in Rochester, N. Y., replacing its present factory at 1255 University Ave. The proposed plant would at least double the size of the present unit. The company makes surgical and dental lights and sterilizer and bacteriological apparatus.

Auto Equipment Firm Expands

Monroe Auto Equipment Co., Monroe, Mich., is constructing a building to provide for an expansion of research and product development facilities. The company has received orders from six automobile manufacturers for its hydraulic power guide steering unit. This unit probably will be installed as standard equipment on at least five 1954 model passenger cars.

Herbine Heads Association

Stanley C. Herbine was elected president of Industrial Safety Equipment Association, New York. He is industrial sales manager of Willson Products Inc., manufacturer of personal safety equipment at Reading, Pa.

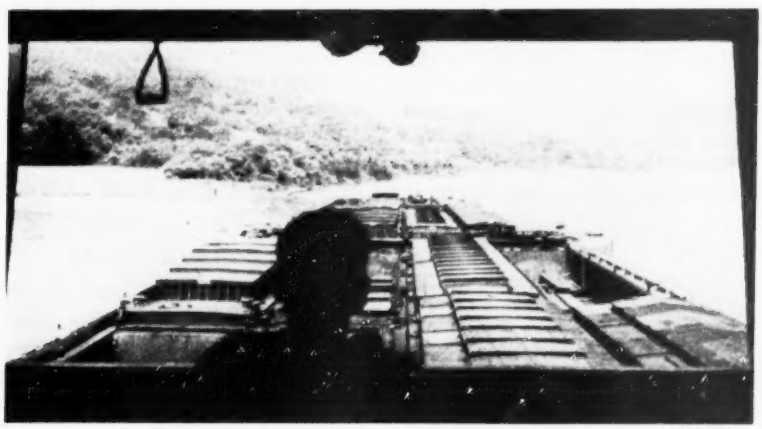
Gargantuan Vessels

PFAUDLER CO., Rochester, N. Y., is manufacturing what probably will be by far the world's largest glassed-steel chemical processing vessels. They are four heavy-duty vessels for processing vinyl polymers and are scheduled for delivery to the Painesville, O., plant of Naugatuck Chemical Division, United States Rubber Co., New York.

Each vessel will have a 7500-gallon capacity, more than twice that of the biggest known glassed-steel unit now in operation. Each vessel, complete with its agitation unit, towers 22 ft high.

Mayfair Completes Project

Mayfair Industries Inc., Chicago, completed its expansion program with the installation of $125,000 of new equipment. This will enable the company to double its production capacity. Mayfair specializes in stainless steel aircraft precision parts, connectors, plugs and studs.



United Press

Steel Product Shipment Barged on Way to Africa

An Ohio Barge Lines towboat is shown above pushing 19 barges loaded with 17,000 tons of steel products and 20 miles of track for the Atchison, Topeka & Mozambique Railroad in Africa. The cargo probably is the largest single shipment for Africa ever handled on the Ohio river and will be transferred to an ocean-going vessel at New Orleans. Tow is 1075 feet long; 104 feet wide

Bearing Supply To Rise

Miniature Precision Bearings Inc. will establish manufacturing plant on West Coast

WITHIN a matter of weeks West Coast precision manufacturers are going to have their own regional source of miniature ball bearings with complete bearing stocks. The former dependence on deliveries and service from the East will be eliminated.

This is being made possible by establishment of a West Coast branch of Miniature Precision Bearings Inc., Keene, N. H., manufacturer of miniature pivot and radial ball bearings, precision parts and tools. Several locations in the vicinity of major industrial markets are being considered.

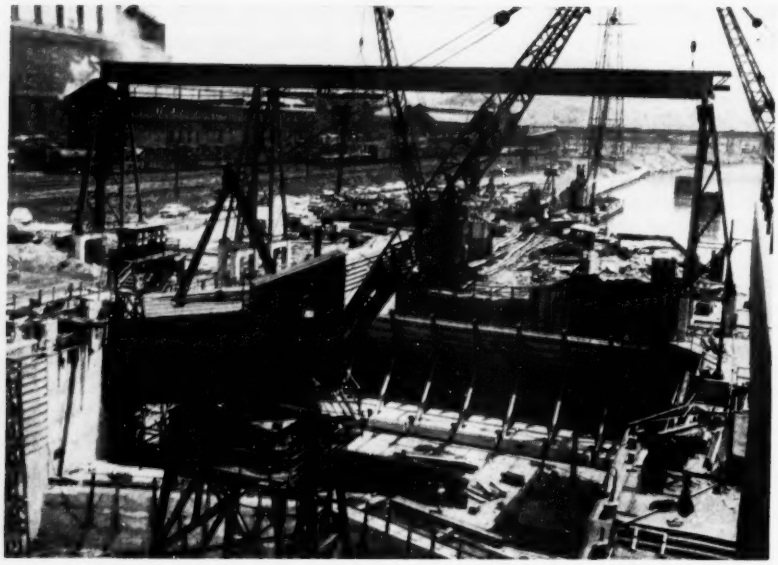
Demand Gains — Inquiries and orders from the West Coast and Rocky Mountain regions, says Horace D. Gilbert, president, have doubled those of a year ago. In the two areas, Miniature Precision Bearings serves about 30 basic industries and 68 specialty industries, representing many companies.

The West Coast plant will be partially provisioned initially by the main factory in Keene. Later when the company can meet the demand for its products in the western states, the new branch plant may be used to supplement its eastern production. Such a setup should provide good insurance against any calamity which might disrupt the flow of these components to either area.

The initial operation, a pilot run comprising certain finishing and gaging operations, will provide assembly and lubrication to customer specifications. Additional processes will be included gradually.

Peerless Reaches Milestone

Peerless of America Inc., Chicago, held ceremonies recently marking delivery of its 500,000th 75 mm armor piercing shell. The firm's plant is equipped with standby tooling to permit rapid changeover from one type of 75 mm shell to another in relatively short time. The company is preparing now to start production of 75 mm chemical



Removable Steel Gates Form Emergency Dam

Unique arrangement of 18 removable fabricated steel gates (above right) forms an emergency dam for the upstream end of the landward chamber of Lock No. 2 on the Monongahela river at Braddock, Pa., being constructed by the Contracting Division, Dravo Corp., Pittsburgh. The gates are installed on collapsible trestles, raised into position by chains and hoists. Section of the gate hoist bridge is shown (above left) being lowered into a barge at Dravo's Neville Island plant

shells as a result of an additional contract amounting to $1.5 million just awarded by the Chicago Ordnance District. Peerless normally is engaged in production of commercial refrigeration and air conditioning equipment.

Instrument Firm Moves

Aero-Cal Instrument Inc. moved its plant and offices to 34 Munson St., Port Washington, Long Island, N. Y.

Helicopter Plant Expanded

Bell Aircraft Corp., Buffalo, purchased a second standardized steel building from Luria Engineering Co., Bethlehem, Pa., for erection at its helicopter manufacturing plant in Hurst, Tex.

Sharon Closes for Vacation

Can costs be trimmed by closing mills and giving all employees a vacation at the same time?

To test this question, Sharon Steel Corp., Sharon, Pa., has closed its Lowellville, O., plant, idling a blast furnace, four open hearths and two electric furnaces. Five open hearths and a blast furnace have been closed at Farrell, Pa.

Sharon will undertake necessary maintenance and repair work during the shutdown.

Dearborn Moves Division Office

Dearborn Chemical Co., Chicago, manufacturer of water treatment formulas, cleaning compounds and rust preventives, moved its Eastern Division offices to 1601 Linden Ave., E., Linden, N. J., from New York city.

DeVilbiss Builds Plant Addition

DeVilbiss Co., Toledo, O., manufacturer of spray finishing equipment, is building an addition to the building occupied by its Sheet Metal Division in that city.

Kurt Orban Names Distributor

Kurt Orban Co. Inc., New York, appointed A. J. Rod Co., Houston, as distributor of the company's line of German-made machine tools in Houston and southern Texas.

Bearing Firm Changes Name

Bearing Specialists Inc., Cleveland, changed its corporate name to Bearings Inc. The firm's operating divisions, Ohio Ball Bearing, Indiana Bearings, Pennsylvania Bearings and West Virginia Bearings will cease to exist as operating concerns and will be known also as Bearings Inc. Officers of the firm are: Harold C. Schott, chairman of the board; Joseph M. Bruening, president; John F. Raymond, William J. Scully and John B. Desch, vice presidents; Dudley S. Blossom Jr., secretary; and Joseph J. Schott, treasurer.

Steel Firms End Affiliation

Price Iron & Steel Co. and Capital Steel Products Inc., Chicago, have terminated their affiliation and in the future neither will have any financial or other interest in the other company. Walter I. Bregman will continue as president of Price Iron & Steel; Robert B. Bregman, president of Capital Steel Products.

Outlines Packaging Course

John W. Kraus, Thompson Products Inc., Cleveland, has been named chairman of the technical short course in industrial packaging and materials handling that will be presented in Boston during the week of Oct. 19 by the Society of Industrial Packaging & Materials Handling Engineers and Massachusetts Institute of Technology. The course will be presented in

(*Please Turn to Page* 91)

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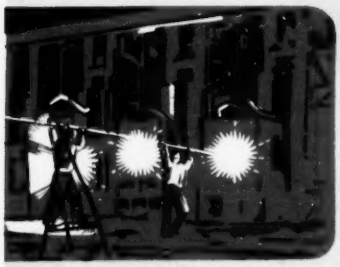
High-Purity OXYGEN and NITROGEN

simultaneously — with ONE Generator

Steel Scarfing

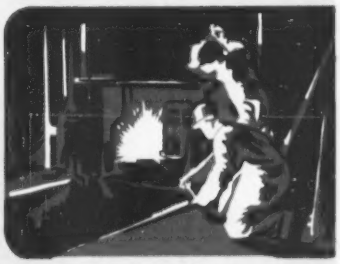


Metallurgical

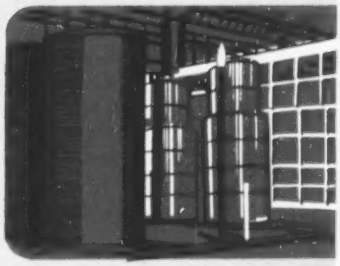
Chemical-Petroleum

OXYGEN

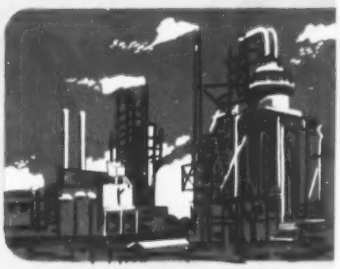
NITROGEN



Heat Treating



Annealing



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Slash costs of inert gas—*while* you cut costs of high-purity oxygen! Make *both* in your own plant with *one* Air Products Generator. Standard *High-Purity* models are available with oxygen capacities from 2500 to 12,000 cubic feet per hour—nitrogen capacities from 4000 to 36,000 cubic feet per hour. *Liquid* oxygen and nitrogen if desired. Also *Tonnage* Generators in standard models, or of special design. Capacities *unlimited!* Write us your requirements, and send for our CATALOG.

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Scrapless nut production is a tough business. It takes the best in know-how, the best in equipment and the best in wire.

You supply the production know-how and equipment and J&L will supply scrapless nut wire that's *right*.

When we say *right*, we mean scrapless nut wire that has the—

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. . . to increase die life, reduce down time and boost your over-all production of a better finished product.

J&L Steel wire is quality controlled from the mine through the finished product. J&L has the modern equipment to produce a really uniform high-quality product. J&L has the steel-making experience to provide a dependable source of supply.

The result—you'll find that J&L scrapless nut wire can't be beat. Why not investigate its economies now? Contact the J&L representative nearest you or write: Wire Products Department, Jones & Laughlin Steel Corporation, 401 Liberty Avenue, Pittsburgh 30, Pa.

BEGINNING A SECOND CENTURY OF PROGRESS 1853 · 1953 J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH

J&L STEEL

(*Continued from Page 88*)
conjunction with the annual SIPMHE-sponsored Industrial Packaging and Materials Handling exposition and National Protective Packaging & Materials Handling competition.

Cairney Engine Moves Plant

Cairney Engine & Boiler Works Inc. moved to 150-170 Lynhurst Ave., Staten Island 5, N. Y.

Rust-Oleum Names Distributors

Rust-Oleum Corp., Evanston, Ill., appointed as distributors of its rust-preventives: Seaboard Mill Supply Co., New Brunswick, N. J.; E. Blankenship & Co. Inc., Marion, Ill.

Caterpillar Forms New Units

Caterpillar Tractor Co., Peoria, Ill., designated a general offices group and a Peoria plant, the latter to operate as a separate and distinct unit similar to the company's other plants. The general offices group is located in the East Peoria, Ill., plant. This new arrangement will enable specialization at each of the firm's plants in the manufacture of the different classifications of Caterpillar products.

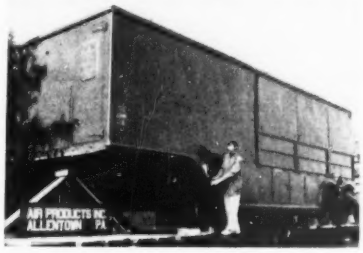
C. A. Woodley, general factory manager at Peoria, was named manager of the Peoria plant; M. A. Clements, manager of parts; L. J. Ely, manager of manufacturing.

Elliott Moves District Office

Elliott Co., Jeannette, Pa., producer of power plant and process equipment, moved its Tulsa, Okla., district office to 910 Petroleum Bldg. The firm appointed W. S. Carlson as manager of its Minneapolis district office and H. D. Mateffy as branch manager of its Duluth office.

GE Establishes New Department

General Electric Co., Schenectady, N. Y., established a direct-current motor and generator department to be located in Erie, Pa. Oscar L. Dunn was appointed general manager of the department which will assume all duties and responsibilities of the company's former dc motor and generator planning study. It also will have responsibility for the dc and synchronous motor and generator lines which are now manufactured by the company's large motor and generator department at Ft. Wayne, Ind., and the armored motor line produced at Erie by the medium induction motor department.



Gas Wafted on Wheels

First of a number of unusual truck-trailers, designed by Trailmobile Inc., Cincinnati, for transportation of compressed gas in 150-pound steel cylinders is shown in top photo. They are built of heavy-duty aluminum. Shown in the bottom photo is a mobile liquid oxygen-nitrogen generator, produced by Air Products Inc., Allentown, Pa. The generator has a capacity of five tons of liquid oxygen plus liquid nitrogen daily. Over-all weight is 30 tons

Forging Ass'n Picks Officers

Raymond G. Sault, president, Porter Forge & Furnace Inc., Somerville, Mass., was elected president of the Drop Forging Association at its annual meeting at Cape Cod, Mass. The new vice president is K. E. Walter, president, Alliance Drop Forging Co., Alliance, O.

Wheeling Firm Opens Branch

Wheeling Corrugating Co., Wheeling, W. Va., established a branch office at 1100 E. Holcombe Blvd., Houston. E. R. Cole is manager. The firm produces galvanized ware, galvanized roofing and many other fabricated steel products.

New Equipment Installed

Colorado Fuel & Iron doubles Pueblo plant's capacity for producing pot annealed wire

NEW annealing equipment has been installed at Colorado Fuel & Iron Corp.'s fully integrated steel mill at Pueblo, Colo. This equipment will double the plant's capacity for production of pot annealed wire, says A. F. Franz, president.

New annealers will supply wire to additional coiling equipment for final processing into standard 48-lb and 100-lb coils of automatic baling machine wire. Baling wire coils have been standardized at 14½ gage with coil lengths of 3150 and 6500 ft.

Speedier Delivery — This standardization has made it possible to use modern packaging techniques, boxing the baling wire for shipment in standard size, easy-to-handle cardboard cartons. The over-all increase in production that has been accomplished by the new equipment and improved methods will result in speeded-up delivery of this product to widespread farm markets.

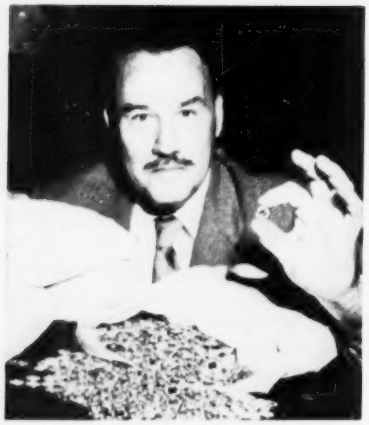
Addition of the new annealers and coilers at the Pueblo steel mill is part of a long-range program of expansion, modernization and product diversification being undertaken by the corporation.

Establishes Pittsburgh Office

Ward Leonard Electric Co., Mt. Vernon, N. Y., established a district office at 3045 W. Liberty Ave., Pittsburgh, with Leonard H. Wurzel in charge.

Sterling Electric Names Agents

Sterling Electric Motors Inc., Los Angeles, appointed as distributors for its electric power drives: Giles Armature & Electric Works Inc., Marion, Ill.; W. S. Bain Co., Newark, O.; Industrial Equipment Co., Joplin, Mo.; Winkle Electric Co., Youngstown; Wedell Electric Supply Co. Inc., Great Bend, Kans.; Electric Fixture & Supply Co., Salina, Kans.; Power Supply, Marshall, Tex.; Erie Electric & Machine Co., Erie, Pa.; Martin Mill Supply Co., Stamford, Conn.;



Headed for Turnstiles

G. F. Cassidy, general supervisor of revenue for New York City Transit Authority, examines tokens in initial shipment of 300,000 from Scovill Mfg. Co., Waterbury, Conn. Total order, to be filled by Aug. 5, is for 7 million

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Venino Bros., Newark, N. J. Sterling also opened a sales office in Rochester, N. Y., and appointed John C. Ringland as office manager.

Ansco Builds in Toronto

Ansco of Canada Ltd., Toronto, Ont., subsidiary of General Aniline & Film Corp., New York, is erecting an initial building in that city. The structure will be one story in height and of yellow brick and concrete block construction. The plant will have space for partial manufacture of the company's products and will also house the Canadian head office and main warehouse.

Lombard Corp. Moves Offices

Lombard Corp. opened new offices at 639 Wick Ave., Youngstown. The company makes extrusion presses, hot and cold metal saws, hydraulic and mechanical shears and similar products.

Cleaver-Brooks Appoints Agent

Cleaver-Brooks Co., Milwaukee, appointed Hathaway - McCartney Engineering & Supply Co., Denver, as sales agent for its self-contained boiler equipment. Cleaver-Brooks manufactures equipment for the generation and utilization of heat.

Metal Finishers Name Officers

National Association of Metal Finishers Inc., Washington, elected as its officers: President, Paul E. Miller, Miller Electroplating Inc., Evansville, Ind.; first vice president, W. F. Walton, Walton & Lonsbury, Attleboro, Mass.; second vice president, C. R. Wheeler, Elyria Plating Corp., Elyria, O.; third vice president, Albert W. Olson, Industrial Plating Works, Seattle; treasurer, Glenn Friedt Jr., United Platers Inc., Detroit; executive secretary, Raymond M. Shock, Washington.

Wales-Strippit Moves Office

Wales-Strippit of Canada Ltd., a subsidiary of Wales-Strippit Corp., North Tonawanda, N. Y., moved its Canadian headquarters to 1105 Main St., E. Hamilton, Ont. The Canadian firm began as a sales branch in 1945 and gradually expanded its activities to include manufacturing. Early this year management decided to curtail manufacturing at the Hamilton location, but at the same time its sales department in Canada was expanded.

Cornell Laboratory Expands

Second building expansion in two years by Cornell Aeronautical Laboratory Inc. in Buffalo will begin in the fall. A recently completed expansion, jointly financed by the Air Force and the laboratory, added 30,000 sq ft. The laboratory's backlog of work amounts to $21.5 million.

Bearing Firm Changes Hands

Preferred Bearing Inc., Bristol, Conn., has been acquired by Walter P. Jacob, chairman of the board, Hartford Electric Steel Corp., Hartford, Conn., and business associates.

The new company, to be known as Bristol Bearing Co., has taken over the entire operation and will produce a line of unground, pressed, radial and thrust ball bearings.

Mr. Jacob is president and Fred Weber, who headed the Preferred Bearing firm, is vice president and production manager under the new ownership. Board of directors of Bristol Bearing includes: Mr. Jacob; Nicholas Martinelli, Pioneer Steel Ball Inc., Unionville, Conn.; Thomas J. Reardon, Hartford Electric Steel Corp.; G. Herbert Semler, attorney, New York; and Henry A. Wilmerding of New York.

San Diego Warehouse Opened

San Diego Pipe & Supply Co. opened a plumbing supplies warehouse and showroom at 5150 University Ave., San Diego, Calif.

Van Norman Buys Western Firm

Van Norman Co., Springfield, Mass., machine tool builder, has taken over Diversified Metal Products Co., Los Angeles, and will move the operation to Springfield. Van Norman will begin manufacture of the California firm's Diversimatic grinding machine.

Bremen Inaugurates Air Service

Bremen Bearings Inc., Bremen, Ind., placed a small airplane into service in its sales department for economy of sales time and emergency service to customers.

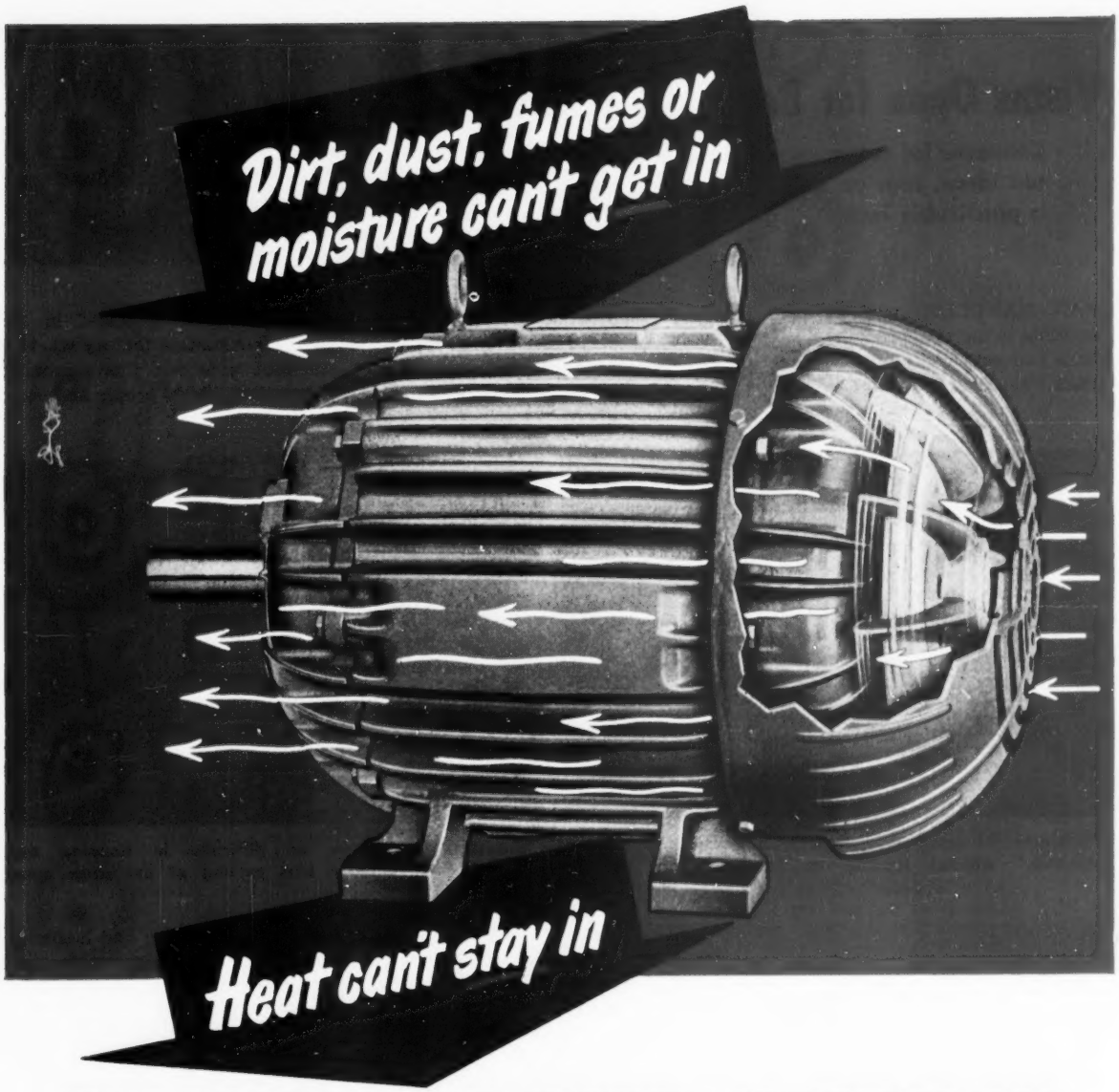
Doepke Appoints Distributors

Charles William Doepke Co., Rossmoyne, O., appointed as distributors for its small parts material handling system: M. E. Neprash Co., Cedar Rapids, Iowa; Nook & O'Neill Inc., Cleveland.

Hocus-pocus!

SHORTEST Air Force contract on record was canceled June 30 by the Defense department. Pacific Airmotive Corp., Burbank, Calif., received the Iran contract, exceeding $3 million, on the preceding day, calling for the overhaul of an undisclosed number of military aircraft.

Iran (Inspect and Repair as Necessary) is the designation given to military maintenance and overhaul contracts where work on each plane is determined after the ship has been inspected.



ELLIOTT CROCKER-WHEELER *Sealedpower* MOTOR

Here's a motor that doesn't care how tough the conditions are. Blizzards of dust or grit can't affect it—not only can't get *in*, but can't even stay *on* the outer case. The powerful fan-driven, cowl-directed air blast sweeps it off, and also drives off the heat radiated from the many fins.

Easy to see why this Sealedpower motor has **for eleven years** been the ace-in-the-hole among engineers who are confronted with drive conditions that would defeat ordinary motors.

Thousands now in service, and going strong in oil refineries, lumber mills, chemical and textile plants, outdoor and indoor installations everywhere. 3 to 125 hp. Also as explosion-proof underwriters approved in most ratings. Get the facts. Address Elliott Company, Jeannette, Pa., or your nearest Elliott district office.

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DISTRICT OFFICES IN PRINCIPAL CITIES
ELLIOTT APPROVED SERVICE SHOPS COVER THE COUNTRY

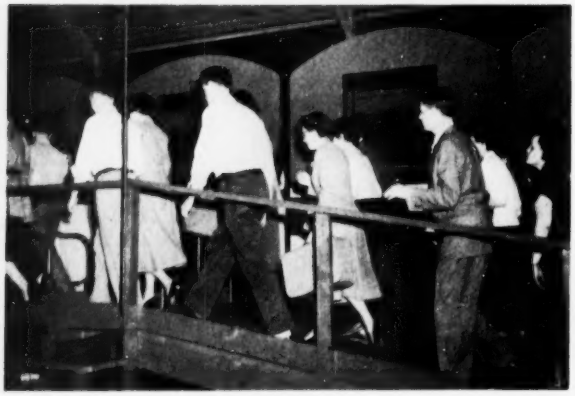
W2-8

MAN AND MATERIALS HANDLING

Vistas Open for Belts and Wheels

Conveyor for commuters and a trackless train, both old ideas, turn up with new twists that give them a practicable look

MAN HANDLING without manhandling is the attractive brief held for a belt conveyor proposed to replace New York's Grand Central to Times Square shuttle. The conveyor, joint project of Goodyear Tire & Rubber Co., Akron, and Stephens-Adamson Mfg. Co., Aurora, Ill., is being tested in the Stephens-Adamson factory where a nine-foot wide belt shows promise of handling 16,000 people an hour.



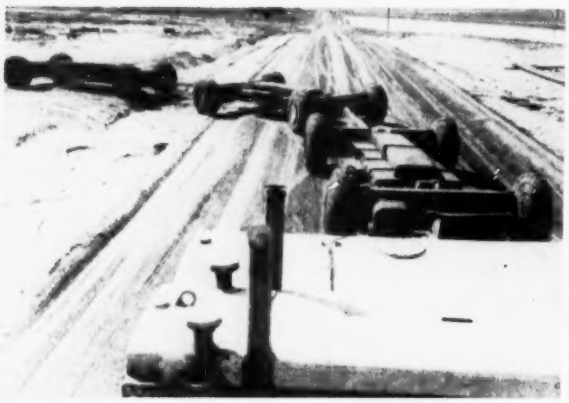
Passengers in rush-hour numbers pour onto the "moving sidewalk" without shoving or jockeying for position

Passengers experience no difficulty in stepping onto the belt from subway cars moving at the same speed

Tournatrain's locomotive looms large

RUBBER-TIRED locomotive and freight car train capable of operating economically in desert sands or up mountain grades that would stall a truck have been unveiled by R. G. Le Tourneau Inc., Longview, Tex.

Heart of the Tournatrain is the "electric wheel," which carries a large pneumatic tire and has within its rim an electric motor and gear reduction. The self-propelled wheels derive their energy from a locomotive which mounts diesel-driven electric generators. An automatic steering device causes each car in the train to duplicate the path of the locomotive.



Tournatrains now abuilding include eight 20-ton capacity freight cars, here tracking in the locomotive's path

A separate electric motor drives each wheel, making each car self-propelled. Center motor is for steering

Here's an idea: Stainless Steel Tubing

Maybe your product has to be attractive. Or sanitary, easy to clean. Or strong, and long lasting. Maybe you want high resistance to heat and corrosion. Easy fabrication. Low end cost.

You'll find all these advantages in ELECTRUNITE Enduro Stainless Steel Tubing and Pipe. Formed from clean, flat-rolled steel. Uniform wall thickness . . . uniform concentricity . . . uniform quality, inside and out. You can bend them. You can join them by fusion or resistance welding. Or solder them. Or braze them. You can grind, polish or buff tubing to a mirror-like finish . . . I.D., O.D., or both. Or Republic will do it for you. We'll fabricate it, too.

ELECTRUNITE Enduro Stainless Steel Tubing and Pipe are available in a variety of chromium-nickel analyses. Tubing also in type 430. The type that fits your particular application . . . properly used . . . can pay its way in better performance and lower maintenance costs. Republic engineers and metallurgists will be glad to help you choose it. For design data and specifications, write to:

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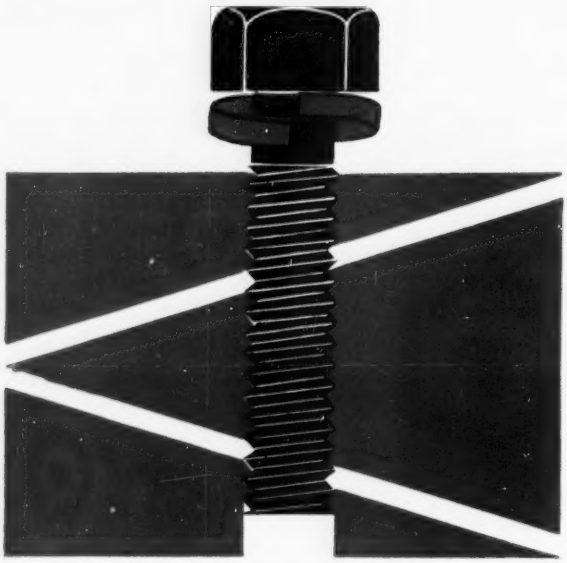
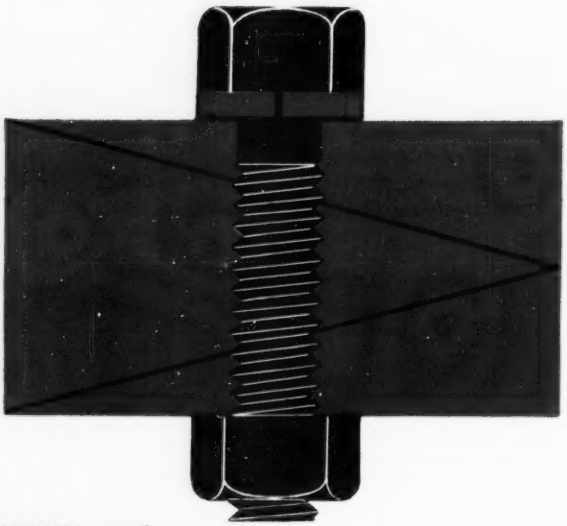
Republic
ELECTRUNITE
STAINLESS STEEL TUBING AND PIPE

PRODUCED BY THE MAKERS OF ELECTRUNITE — THE ORIGINAL ELECTRIC WELDED BOILER TUBE

DESIGN FOR FASTER PRODUCTION





PARTS ASSEMBLED MORE QUICKLY and EFFICIENTLY with EATON SPRINGTITES and SEMS

(screw or bolt pre-assembled with helical or tooth-type washer)

■ Designers give their products a big boost toward success when they specify Eaton Springtites and Sems for fastening assembled parts. Not only are they specifying a fastener they can depend upon to meet required specifications, but they are materially aiding other departments. For example, the production department can turn out more and better finished goods by reducing waste motions on the assembly line. By giving the production worker a lock washer and bolt or screw preassembled, one motion is automatically eliminated. Purchasing can save by writing one order instead of the usual two. And, as for the stock department taking inventory, their work is cut in half.

Eaton Springtites and Sems have been speeding up production lines and helping to turn out better products for a long time. They do the job that is expected of products with years of "know-how" and experience behind them. Specify them on your next design job — there are sizes and types to fit all requirements.

See your nearest Reliance Sales Office for complete details on Eaton Springtites and Sems or write directly for Engineering Bulletin No. S-49.

Eliminate Waste Motions

*Switch to **Eaton** Springtites and Sems*

RELIANCE DIVISION EATON MANUFACTURING COMPANY

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STEEL
July 13, 1953

Technical Outlook

PRESSURE INSTRUMENTS—Strain gages are adding science to the art of rolling. One class of instrument uses hydraulic jacks or electric jacks at some loaded point of mill; the other measures strain on some part of mill structure proper. Writing in the May-June issue of *United Effort*, publication of the United Engineering and Foundry Co., Pittsburgh, companymen, J. I. Greenberger, in charge of processing equipment, and R. H. Ellis, engineering department, say strain gages make for optimum production within design limits.

TWO-IN-ONE FLOOR—Doubling area within structures such as garages, to gain parts storage space, can be a simple second-story renovation. One extra floor was installed recently at minimum expense simply by raising steel supports and adding steel flooring in the form of open grating. Free flow of air through the grating leaves heating and ventilating situation unchanged, and open design is a bonanza for sweepers because dust, dirt and oil cannot accumulate.

BLASTED TACONITES—Big difficulty in blasting taconite bodies into anything smaller than quarrystone blocks is nearer solution. Bureau of Mines experiments have uncovered some successful techniques. Blast, for which explosives were loaded in holes drilled in staggered, parallel rows, breaks the most ore, and firing charges with millisecond delay detonators eases removal of broken ore. Breaking up big blocks could be an expensive proposition since nearly three tons of taconite must be mined to get one ton of furnace ore.

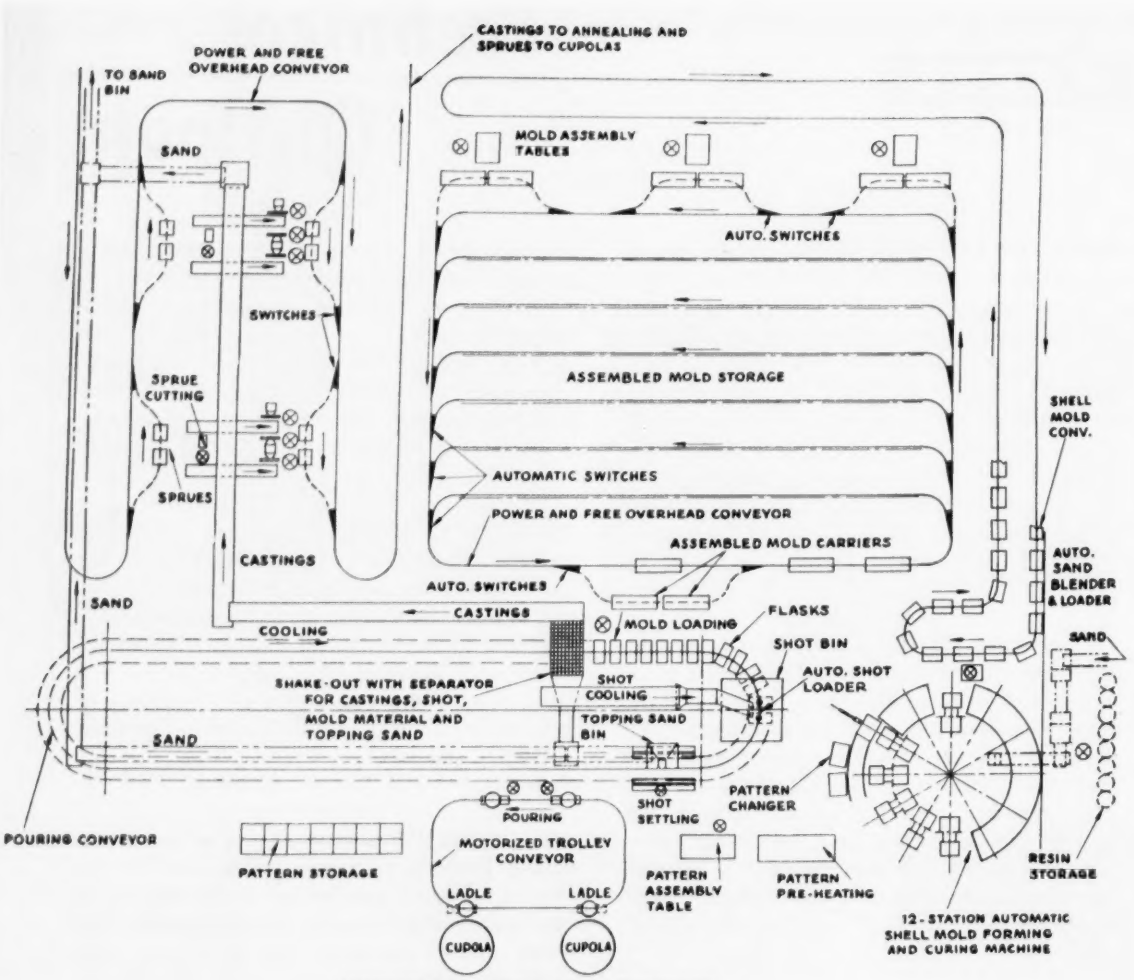
BRITTLE FRACTURE—In discussing conditions for brittle fracture in terms of steel properties at the recent A.S.T.M. meeting, S. L. Hoyt, Battelle Memorial Institute, pointed out that the transition temperature is only indirectly related to service fractures because the transition temperature of brittle fracture is usually different from that of the service failure. Point emphasized was the principle of matching the service failure with the test bar geometry which produces brittle fracture at the service temperature. At the same meeting, Sam Tour reported on work done to develop a steel with high impact strength at high hardness levels for use in hand tools at low temperature. Suggested composition was about 1 per cent molybdenum, 1 per cent manganese, and 1 per cent silicon, with a carbon level in the range of 0.40 per cent.

CHEAPER TITANIUM—If a new electrolytic method for making titanium works out, price of sponge metal may be reduced from the present $5.00 a pound to around $1.50 a pound. Process uses purified titanium dioxide. United International Research, Inc., expects to have a pilot plant and a commercial cell producing in the range of 4000 pounds per year in operation sometime this fall.

NEW COATING—According to a report prepared by Battelle Memorial Institute for the President's Materials Policy Committee, boron has a promising future as a coating material for both metallic and nonmetallic products. Coatings are exceptionally hard since boron, boron carbide or boron nitride can be formed in place. Depending on the base material, borides of silicon, zirconium, vanadium, and tungsten can be formed to give a wide range of chemical, wear and heat resisting properties. Borides protect against oxidation up to 2200-2400°F.

CHECK LIST—Principal contributions to success in cold extrusion are rugged die constructions and materials, dual surface bonded lubrication, concentricity precautions and not trying to do too much at once, which means a correct understanding of the operations involved. This is the way it was put by E. V. Crane, E. W. Bliss Co., Canton, O., in a paper prepared for the special conference on cold extrusion, held recently in London, England. Compressive working of confined metal in extrusion dies has certain advantages over tensile working of massive shapes in draw dies. Here's one: The tendency to crack in tensile fractures around the outside corner radius of heavy drawn caps can be especially troublesome.

Metalworking Outlook—p. 49 *Market Outlook—p. 159*



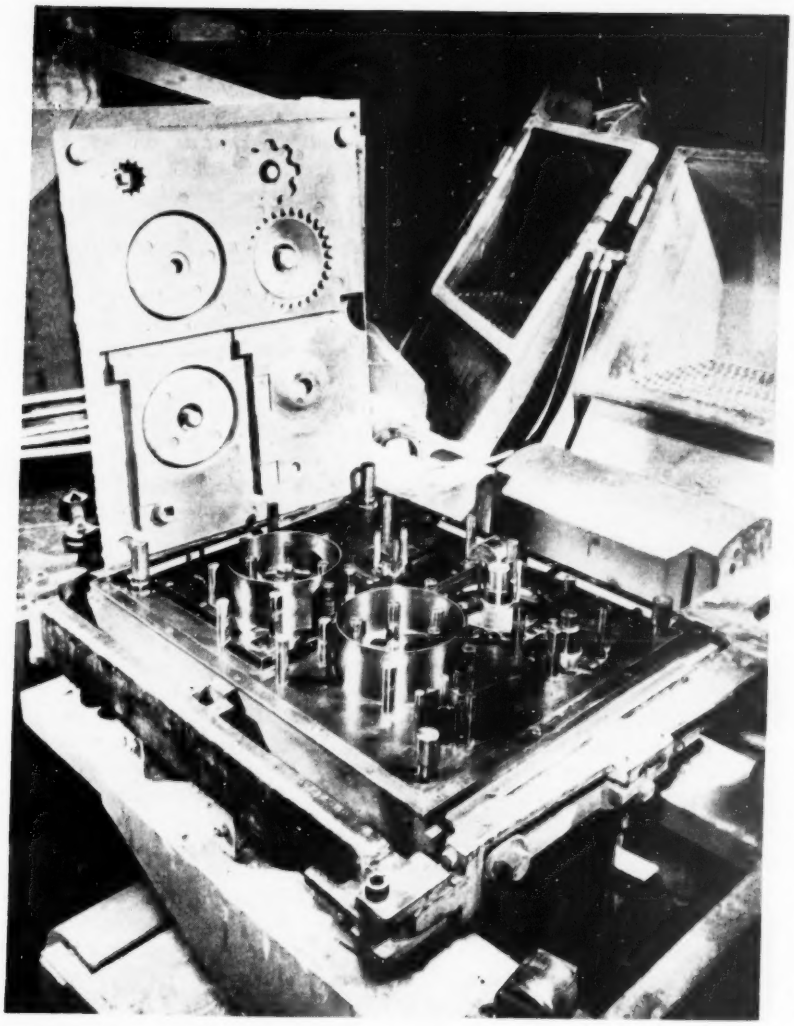
MECHANIZED SHELL MOLD FOUNDRY

Automatic Foundry

NEARS REALITY

By LEONARD J. BISHOP
Vice President
Mechanical Handling Systems Inc.
Detroit

Shell molding machines tied in with other modern handling equipment make possible volume production of quality castings with low manpower requirements



Closeup of a pattern at mold delivery position of the 12-station machine. Mold is typical of accuracy possible with continuous, automatic operation

FULLY automatic foundry operation has long been a goal for engineers, but attainment didn't become a reality until the advent of shell molding.

While automatic handling has been used to some degree in conventional sand mold foundries, there are limitations on efficiency which machines cannot completely overcome. Conventional molds are hand-made, and the rate of production is dependent on how many skilled, highly-paid mold makers are working, and on the number of molds they are able to make per day. Space required for green sand molding is large and open and the goal of streamlined efficiency is hard to reach under these circumstances.

Shell mold production is mechanically done, by a compact machine, at a production rate that can be maintained steadily. It requires a minimum of labor. One operator, unskilled, can produce enough molds to keep the foundry going at peak efficiency.

Hold the Key—MHS shell molding machines, designed and built for high production of shells, are the key to the automatic foundry. We had to create them first, then design the rest of the foundry to match the speed, cleanliness, economy and efficiency of the shell mold machines.

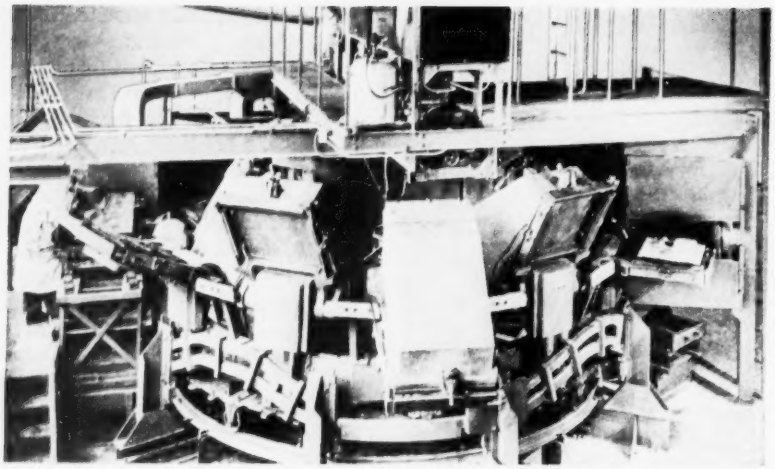
The 12-station machine has a capacity of 480 molds per hour and is so completely automatic that it requires only one operator. Pattern size on the standard machine is 28 x 22 inches. Patterns may be changed at any time, without stopping the machine, so that mold production is extremely flexible and adaptable. Machine rotates in a counterclockwise direction, each station producing a finished shell mold in each revolution.

Neat Package—Sand, resin and wetting agent, drawn from storage containers on top of the machine, are mixed automatically in the correct proportions and deposited in each hopper. The heated pattern rises, engages its hopper, and returns to below the horizontal while the sand-resin mixture is deposited on the pattern. Pattern and hopper rise, are disengaged, and the pattern plate, with its uncured mold, descends to a horizontal position and enters a curing oven heated by radiant gas burners. When the cured mold emerges from the oven, ejection pins raise the mold off the pattern for easy removal, and the cycle repeats. Same design principles and automatic operation are incorporated in a 6-station shell-molding machine.

Taking Shape—With the 12-station unit as the starting point, our fully automatic shell molding foundry began to shape up. A standard overhead conveyor, with special carriers, is synchronized with the shell mold machine so that each pattern station delivers molds to its own carriers on the conveyor which automatically perform the functions of separating and classifying them.

Molds travel the conveyor to the mold assembly and core placement benches, where three men put cores in place, clip or glue together the cope and drag sections of the mold, and put the assembled molds on the storage and delivery conveyor.

This conveyor is of the power and free type. There are free stations at each mold assembly bench, where carriers are loaded with the completed molds. Loaded carriers are dispatched automatically to 12 mold storage lines, with like molds stored together. Molds are called out of storage by the operator who assembles the molds in flasks. The assembler pushes a button at his station, actuating an indexing bar



Twelve-station machine can produce 500 shell molds an hour. It is automatic from sand and resin blending to finished mold. Only one man is needed to operate compact unit, which moves counterclockwise in its work cycle

on the proper storage line. This bar pushes a loaded carrier out of storage and onto the power section of the conveyor for delivery to the assembly station. Thus the production schedule is followed by pulling out exactly the molds needed from the storage lines, in the exact order the schedule requires.

Automatic Backing—As the carriers come from storage with their loads of assembled molds, they are switched onto a free section of conveyor. The operator places the molds in flasks which are on a plate-type conveyor running parallel with the power and free line. The molds are backed with shot automatically. Shot protective material is put on by an operator who also inspects the flask and removes the protective plug from the pouring spout.

A powered monorail loop brings molten metal from the cupola in ladles to the pouring station, which is a platform moving at the same rate of speed as the flask conveyor. Pouring is done with such ease and speed that only two men are needed for metal supply and pouring.

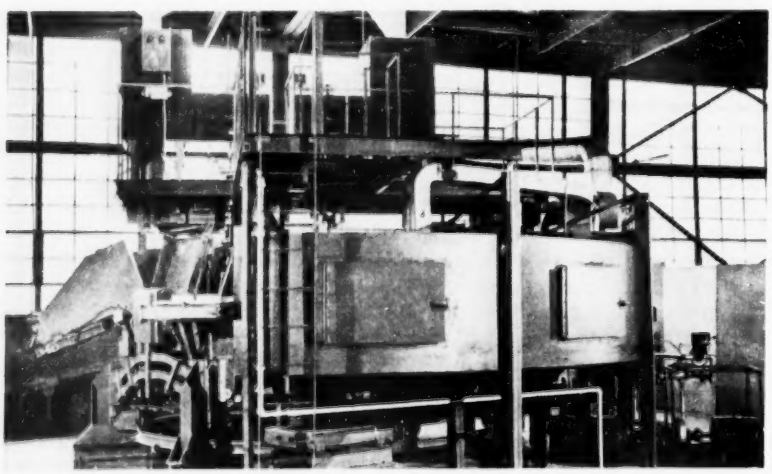
Back to the Job — Flasks with cooled castings are automatically transferred to a shakeout point where castings, shot and sand are separated. Shot is returned by conveyor to the shot hopper near the flask assembly point, where it is automatically cleaned and cooled before re-use. Sand is recovered, cleaned and returned by belt conveyor to the sand hopper. From the shakeout, castings are discharged onto a castings cooling conveyor and are delivered to sprue removal.

After this operation, the castings are classified and placed on carriers waiting on the free line of a power and free conveyor. When loaded, carriers are switched to the power line and are delivered to storage or finishing.

Small Labor Force—This automatic foundry requires only 15 to 16 men for its operation. None of them needs special training or special skills and a minimum of supervision is required. Yet this small force of unskilled labor will handle four molds per minute, 1920 molds per 8-hour shift, producing about 50 tons of small castings every 8 hours. A conventional mechanized sand foundry of the same capacity for small castings would require a labor force several times as large, and would include a number of highly-skilled, highly-paid workers. This does not include the maintenance crew and the laborers needed to keep the sand mold foundry reasonably clean.

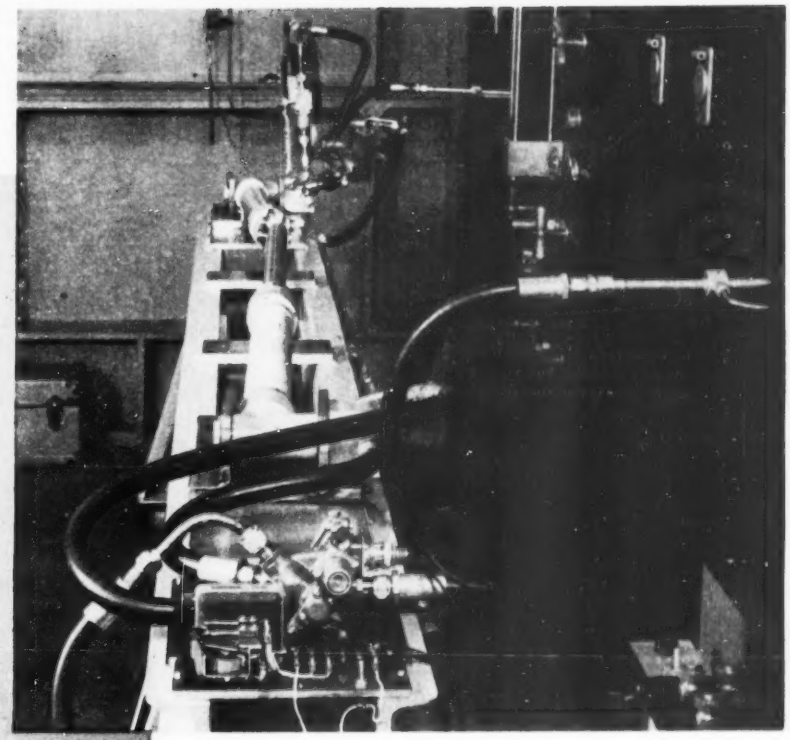
Comparison of efficiency, labor force, and production rates is, of course, only part of the difference between the fully automatic shell mold foundry and the mechanized sand foundry. There's the difference in casting finish and dimension, with the shell mold casting having a smoother, finer surface and dimension tolerances held within a few thousandths. More castings are obtained per ton of metal melted. Machining and finishing requirements are far less costly and time-consuming in the shell mold foundry.

Cleanliness is another dramatic difference. With shell molding, the "white-tile foundry" may well come true. Materials used in making the molds are all inherently clean, and the processes of mold assembly, pouring, cooling, and recovery of sand and shot are so engineered that there isn't any dust and dirt. Better work conditions result.



Pattern plate with its uncured mold is shown entering curing oven. Equipment for proportioning sand, resin and wetting agent is visible at top. Radiant gas burners provide heat. Note general cleanliness of the shop

Hydraulic cylinders get a life test of 20,000 cycles at 3000 psi. They are purposely misaligned to produce conditions of severe side loading



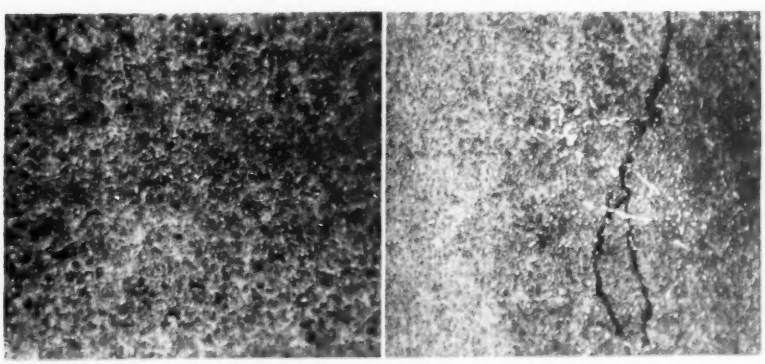
Quality Control Takes Teamwork

By HERBERT A. PRELINGER
Research Engineer
Adel Division
General Metals Corp.
Burbank, Calif.

Some examples of the co-ordination of production personnel with laboratory and control staffs. System guarantees customer satisfaction and uninterrupted production

MUCH thought, skill and experimentation go into new developments. But before production can start, tooling must be completed and the raw stock cleared for production by the metallurgical staff. This latter point is of vital importance at Adel where we are engaged in development and manufacture of hydraulic equipment for both aircraft and general industrial purposes.

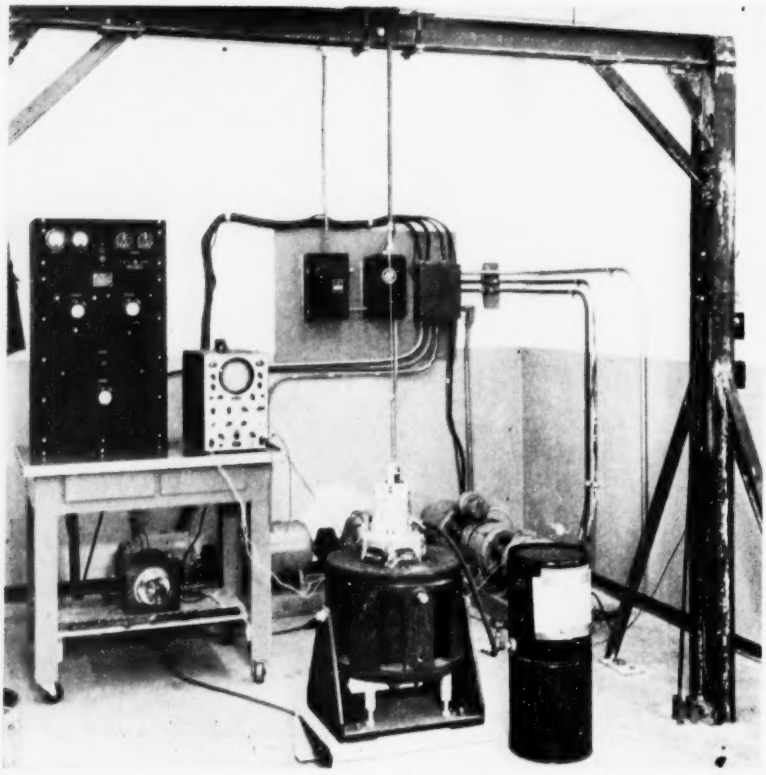
It is most advisable and gratifying to make the individuals, employed in testing raw stock, conscious of the importance of their work, and conscious of the fact that it is up to them to eliminate spoilage in production due to faulty material. A well organized and rigid system of checking and testing incoming materials is a must for every plant that wishes to give complete protection to its customers.



Agglomeration of carbides around grinding cracks caused trouble (right). Perfect 52100 steel sample shows uniform structure of dispersed carbides

Starting Point — Whether aircraft or non-aircraft quality steels, aluminum, or brass, inspection starts with checking dimensions, observing and grading surface conditions, and testing for Rockwell hardness. Where necessary, depending upon the steel's application, magnetic inspection is carried out to detect hidden defects in the metallic structure.

Hardenability tests are performed with plain carbon steel grades having a minimum carbon content of thirty points, also with light alloy steels and martensitic stainless steels. When dealing with



Vibration experienced with a normal installation in aircraft is simulated on this vibrator at 100 cycles per second. Adel K-pump is being checked

steels of the last mentioned two groups, it is most advisable to check every bar in the lot. It is less expensive to do so than to reject machined parts at a later moment due to mixed stock or to stock of poor quality.

Chemical Check—If the hardenability test does not show the expected results, the material in question is submitted to the laboratory for chemical analysis, the result of which is sent to the head of the inspection department for further consideration, a procedure which usually ends with rejection of the material.

In spite of the fact that most of the steels used are certified as to their physical and chemical characteristics, mix-ups in material due to vendor's negligence are occasionally found. In such cases, one depends entirely upon the watchfulness of the control staff to prevent the wrong material from entering the manufacturing cycle.

A Look Inside—Internal cleanliness is determined by hot acid etching to reveal the structure of steels as to pipes, porosity, and other irregularities. Besides the standard testing procedures, tests for rating nonmetallic inclusions are extensively employed in cases where critical areas indicated on the blueprint require steel of high cleanliness. Step-down tests covering critical areas, along with hot acid etching, are carried out in most laboratories, and have frequently led to the rejection of materials, thereby avoiding costly spoilage in production.

Sometimes Confounding — Most metallurgical laboratories have realized that the general methods of testing incoming stock are not always sufficient to guarantee a material of the required quality. For illustration, I wish to refer to one case in particular, where, for one of our parts, we used 52100 alloy steel, heat treated to a hardness of 63 Rockwell C, surface ground, and finally plated with cadmium.

Ordinarily, no trouble had been experienced in producing this part, after the know-how was acquired. But one day, a lot of several dozen of the finished part was found to have cracks. A preliminary investigation pointed definitely to grinding cracks. However, there was no careless or faulty processing of any sort to be found on which the defective work could be blamed. After considerable research, it was found that the cracked parts were characterized by a peculiar microstructure which apparently was responsible for the cracking.

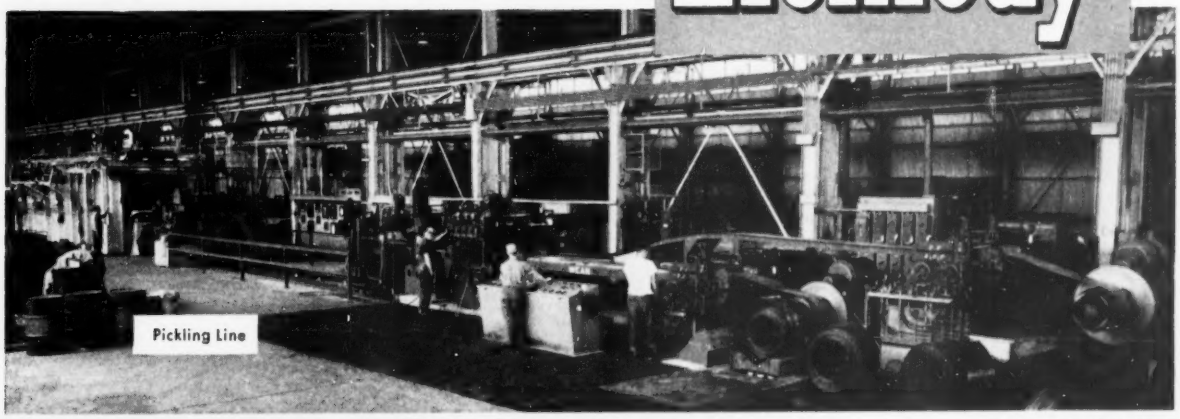
Massive Carbides—In the photomicrograph, a great number of massive carbides can be seen embedded in the matrix of tempered martensite. These undissolved, hard carbides, when agglomerated as coarse voluminous globules, may act as hard spots when subjected to grinding, producing localized heat centers, with the resultant setting up of additional surface stresses.

During cadmium plating, hydrogen embrittlement probably had set in, and the surface stresses became relieved, with cracks as the result. Note the position of the cracks traveling through the field of heavy carbide agglomeration, from which the cracking possibly had started to develop. In the other photo the micro-structure of a perfect part is shown for comparison. Note the uniform structure with only small spheroidized carbides well dispersed. This structure is desirable, and will cause little or no trouble in grinding, as had been experienced in the past.

Proved A Point—From the results of this investigation it was concluded that for the fabrication of this particular part we must use a 52100 steel whose microstructure after heat treatment must be free from massive and heavy agglomeration of undissolved carbides. It also was decided to examine the micro-structure of every bar of 52100 steel to be used for certain specific parts, and to reject or refine materials which do not meet the micro-structure pattern as seen in the second photomicrograph.

This example serves to illustrate that by proper co-ordination of the production personnel with the laboratory and the control staff, a system is at work that guarantees protection to the customer, and at the same time insures an uninterrupted rate of production.

Mechanical installation by—Eichleay



NEW CLAD METAL Process Plant Superior Steel CORPORATION

The new plant of the Superior Steel Corporation represents the highest development in the process of metal cladding—and will boost the company's capacity from 30,000 tons to 80,000 tons per year.

To the Eichleay Corporation was entrusted the mechanical installation of two Annealing and Pickling Lines, a Three Tandem Four High Cold Mill and a complete Billet Assembly Line.

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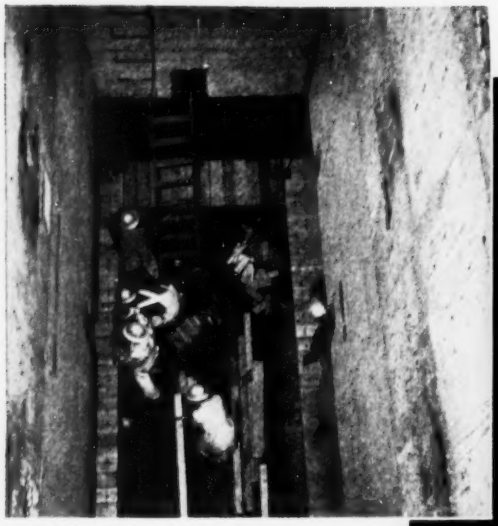
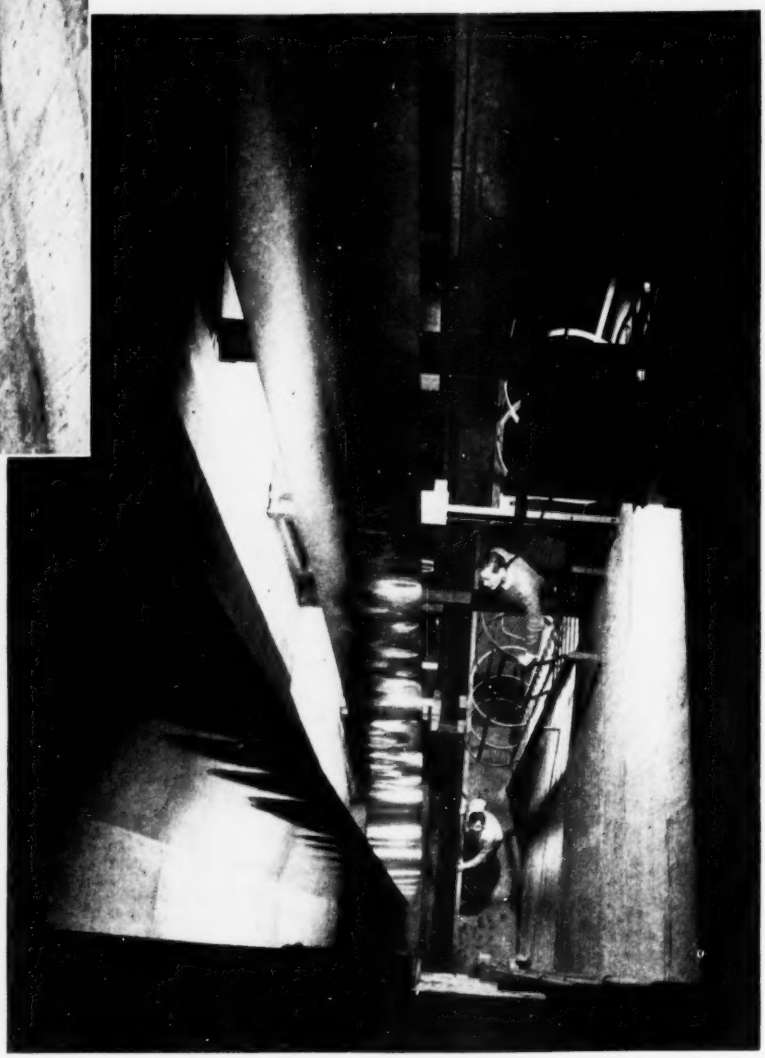


Workers ready walls for one of succession of eight top-down concrete pours it took to complete 70-foot pit

In operation, an endless steel ribbon drops into the underground looping pit beneath the electrolytic tinning line



Step Down Pour

WALLS COIL PIT

Looping pit excavation had to be done in cramped quarters within electrolytic tinning facilities. Eight sectional pours, working from top down, made the operation fit job conditions

LIMITED work area was one construction complication overcome in sinking a 70-foot-deep looping pit within the facilities at Kaiser Steel Corp.'s Fontana, Calif., tin plate mill. Because building footings around the pit location were already poured, Kaiser Engineers Division had to come up with a procedure that suited job conditions and still held costs relatively low.

The 8 x 20½-foot pit is used to play out 36-inch-wide steel sheet to the electrolytic tin line while a new coil is being placed and butt welded to form a continuous strip. Coil change and welding require about 20 seconds, so the loop within the pit furnishes the slack that keeps tinning equipment operating.

From the Top Down—The job was completed in seven sectional concrete pours of 8 feet or less, working from the top down. Actual pit constructed in this manner was 49 feet deep, because the starting point was at basement level.

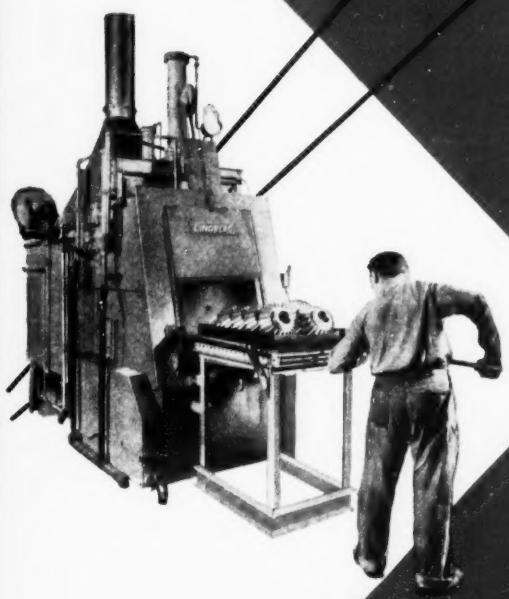
First 8 feet were excavated with upper portion sloped out to form a natural concrete wedge. At the bottom was placed a shiplap soffit and 2 x 6-inch keyway. Reinforcing was installed, vertical bars extended 5 inches through the soffit and inside forms built. Six wedge-shaped blockouts, 2 feet wide and 2 feet high, were built on the soffit —two on each side and one at each end—to provide pour pockets for the next section.

Hand-Trimmed Walls — Successive pours were scheduled each third day and forms removed as soon as concrete was sufficfently strong to allow start of excavation for the next 8-foot step. A clamshell bucket removed dirt, with final walls being hand trimmed. For each step, the soffit was replaced and reinforcing bars attached to those protruding downward from the previous section by a 5-inch lap weld.

Hoppers were installed opposite the six blockouts and concrete was placed through a 6-inch diameter elephant trunk. Aluminum powder used at 2½ grams per sack of cement helped seal joints by expansion at sealing points.

5 FURNACES IN ONE

the *LINDBERG* Carbonitriding Furnace



Yes, it's many furnaces in one! It's designed not only for carbonitriding . . but also for hardening, carburizing and carbon restoration. It's self contained . . it's easy to maintain!

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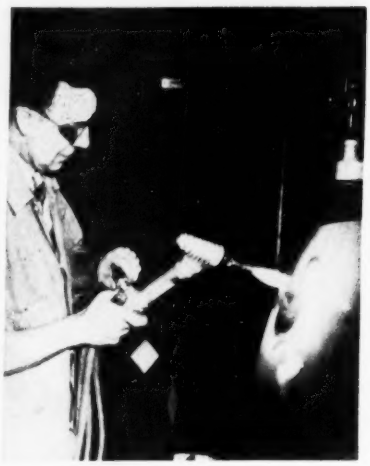
Porcelain Coating in Field

New method permits spray-fusion coating of structures too big for factory treatment

WAR against steel corrosion, which annually causes billions of dollars worth of property and material damage, has developed a new technique. Seaporcel Metals Inc., Long Island City, N. Y., manufacturer of architectural, marine and industrial porcelain products, developed the system.

The process, utilizing a novel device called the "flame-spray handgun," shoots porcelain material through an acetylene torch and fuses it to steel. It has been under experimentation for 18 months and is the result of years of porcelain study by Paul Cecil, the company's chief of research. The gun is still undergoing tests and development in the company laboratory.

Field Applications—An adaptation of a hand-gun normally used



COATINGS COME EASY
. . . like spraying hot metal

for spraying other molten materials, the equipment, by virtue of its portability, will open the way for field application of porcelain for the first time to bridges, maritime vessels, buildings and other steel structures too large physically for factory treatment. Thus, this basic industrial metal will be able to acquire a lasting protection from the ravages of sea water, the elements, smoke and chemicals.

Basically duplicating the factory

Handclasp of a friend-in-need

There's confidence in the very "feel" of the world famous C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers. The quick-acting "Squeez-Grip" fits your hand naturally like a handclasp... hangs right... carries right... works right. You're in complete command of the situation instantly... no fumbling... no fatigue.

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It's not hard to see, when you fully compare and try, why C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers are your best buy for killing flammable liquid and electrical fires, as well as some surface fires involving ordinary combustible materials. Sizes range all the way from 2½ to 100 pounds capacity... all fully approved by the Underwriters' Laboratories, Inc., Factory Mutual Laboratories, Armed Forces and Government Bureaus.

With C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers the penetrating carbon dioxide is a clean, dry, non-damaging, non-conducting, inert gas... smothers fire instantly, leaves no after fire mess... harmless to equipment, materials and finishes... even food is still perfectly edible.

Act now for complete free information on these first-rate, sure-acting fire extinguishers. Remember fire doesn't wait ...get the facts today!

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process in which glass is fused permanently to steel in a high temperature furnace, the new device simultaneously melts and fuses the ceramic ingredients onto the metal through the flame. In the first stage of application, the flame, from the gun's one-inch nozzle, preheats the steel surface. When the desired temperature is reached, the porcelain mixture is blown through tiny holes circling the nozzle. As this material passes through the flame, it melts at approximately 1,600°F and is fused to the metal plate.

Five Lines—Materials necessary for the flame-spray operation, comprising the powdered glass and the gases, whose rapid combustion generates the required high temperatures, are channeled to the gun by four rubber feed lines which are controlled by four knobs at the gun's handle.

A line of compressed circulating air acts as a return feed to force the porcelain material up through the gun in a continuous stream and also serves to maintain a workable, cool temperature throughout the metal parts of the gun. Adjustment of the control knobs can achieve any desired proportion of flame and porcelain spray.

Practically the entire 18-month period of experimentation has been spent on the complex problem of ascertaining exactly which porcelain materials could be melted successfully in an extremely short time and applied molten to the steel.

Since each of the frit ingredients which make up the porcelain material possesses a different melting point, determination of the final over-all melting point for fusing to steel has required exhaustive tests and applications.

Publish Cut-off Wheel Booklet

Booklet, "Cutting-Off Wheels," has been published by Grinding Wheel Institute, covering usage, classification, machine and wheel speeds and mountings, plus other subjects such as techniques and handling work. This booklet was prepared by the Safety Committee. Copies may be obtained free from the institute, 2130 Keith Bldg., Cleveland 15.

Advertisement

Efficient Stripping of Rejected Painted Parts

When the volume of painting rejects slows your rate of production—as may occur in the manufacture of rigorously-inspected defense equipment—it is time to plan an efficient method for stripping the faulty coatings.

The rejected parts represent a considerable investment in the cost of metal and the cost of fabrication. To hide 5% of your total production in a corner is like hiding 5% of your working capital in a sock. The quicker you reclaim those rejects and push them through as accepted parts, the better profit you make on your contract.

Sometimes the time element dictates more efficient stripping. Suppose a sub-contractor undertakes to produce 100,000 parts in 20 days. Suppose he averages 5% rejects and lets them pile up until he has 5,000 to strip and re-process on the 20th day.

On that day he discovers with sorrow that it is a lot harder to strip and repaint 5,000 rejected parts than it was to paint his regular daily quota of 5,000 new parts. He misses his deadline and suffers embarrassment that could have been avoided by stripping 250 rejects each day for 20 days instead of 5,000 in one day.

Furthermore, it usually is much easier to strip the parts on the day they are rejected. Even though the parts were thoroughly baked in the ovens, it is still true that the longer the paint ages on the metal the harder it is to remove by any method of stripping.

Dumping rejects into a tank for overnight soaking is not always the best way to strip the paint. Some paints that cannot be removed by immersion in any one stripper—be it alkaline or acid or solvent—respond quite readily to a combination of two strippers.

The technique of rinsing is also important. Some paints yield only to a hot alkaline stripper followed by a hot rinse. Sometimes a cold rinse following a hot immersion seems to provide a shock that removes the paint with great speed.

The economy of finding the best stripping method is so great that it merits careful planning. It may also require the advice of a man who has had plenty of experience with all types of stripping operations. Such a man is the Oakite Technical Service Representative in your city.

At the command of the Oakite Representative are more than a dozen stripping materials that work with great speed and efficiency, whether used for reclaiming rejects from the painting line or for stripping conveyor chains, racks and hooks. Among these materials are:

1. Alkaline strippers that remove many types of paints and are also excellent for "killing" the overspray in water-wash paint booths.
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3. A viscous solvent stripper of special value because it adheres to vertical and inverted surfaces.
4. A solvent stripper and an alkaline stripper especially designed for safe removal of zinc chromate primer from aluminum.
5. An acidic material that strips certain organic finishes and simultaneously removes oil and rust.

For more information on this subject, phone your local Oakite Technical Service Representative or mail the coupon below.

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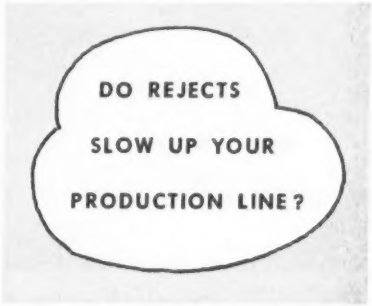

When painting rejects slow your production you may need one of the Oakite strippers described in the free booklet "How to STRIP PAINT." The booklet answers many questions that may help you work out better stripping procedures. For example:

¶ What's the cheapest way to strip metal parts in large volume? *See page 9.*

¶ What strippers are best for removing oil base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? *See page 12.*

FREE For a copy of "How to STRIP PAINT" and for advice on your particular paint-stripping problem, just send us the coupon.

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Send me a FREE copy of your booklet "How to STRIP PAINT." Also, tell me about your methods for removing the following organic finishes:

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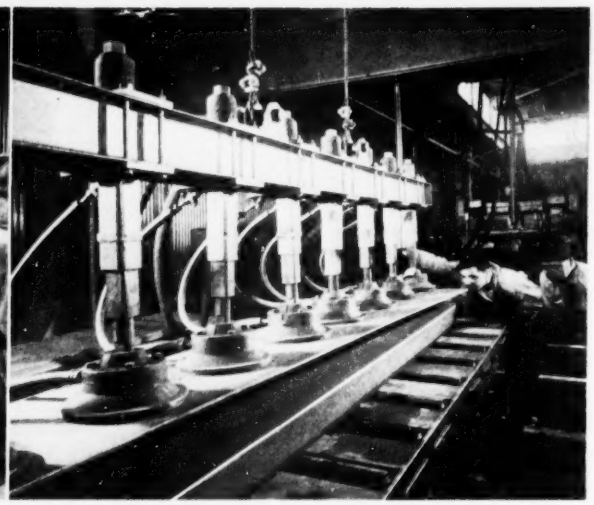
Steel angles are welded to the steel billet to insure perfect cladding of copper to steel in the hot mill. New continuous electric fusion welder does the job



Suction cup holders help position the copper plate on top of the 4-inch steel billet. When all three members of the sandwich are aligned, angles will be welded on

NEW MILL TURNS OUT

Bigger Copper-Clad Sandwiches

Superior's clad steel strip is three times as wide as it used to be. The improved process reduces the cost by cutting down the percentage of copper alloy wasted in edge-trimming

COMPLETION of its new plant for cladding metals at Carnegie, Pa., achieves several objectives for Superior Steel Corp. First, it will enable the company to turn out approximately 80,000 tons per year against a previous output of about 30,000 tons. More important, improved processes and techniques in the plant will reduce the cost of clad metal between $100 and $150 per ton.

Secret of this cost reduction is closely tied in with the new equipment installed by the company which processes clad steel strip three times wider than was formerly possible.

Varied Uses—New strip coming from the company's rolling mills is 17 inches wide. Deduct an inch from each side for steel that must be sheared, and there is still 15 inches of copper clad steel. This strip can be slit for bullet jackets which need a sheet width of five inches, or can be used in a wider form for many civilian uses, among them: Frying pans, non-corrosive plates for ocean-going vessels, parts for electronic equipment, etc.

Previously, the company could only roll cladmetal "sandwiches" of one-third the size, sufficient for bullet jackets, but not wide enough for other civilian uses. I-beams were used to hold the sandwich of copper sheets on each side of a steel slab. Shearage on each strip consisted of the outside edges, which amounted to about two inches of waste for each strip. The same shearage is now necessary, but the amount of clad metal is increased three times.

Big Job—Rather than I-beams, heavy steel angles are now used to hold together steel slabs and copper cladding sheets. But to achieve this money-saving result required a careful analysis of the needs of the company as well as some hefty engineering work to produce an efficient operating unit. As a dividend, the company has additional equipment that can be used to produce stainless strip, another of the company's products, since clad metal and stainless can be produced from the same facilities, with but a few minor technical alterations.

Superior's new cladding plant covers approximately 100,000 square feet and is laid out for efficient, straight line production. At the far end of the plant, steel billets and copper cladding sheets are stored. From storage they move to the billet assembly area. There the sandwich, consisting of a steel billet between two copper sheets, is held until it is taken to the company's hot mill for the first rolling.

Removes Kinks—Several interesting pieces of special equipment are found in the billet assembly department. The first of these is a

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British representatives of Metals Division: Head, Wrightson & Company, Ltd.
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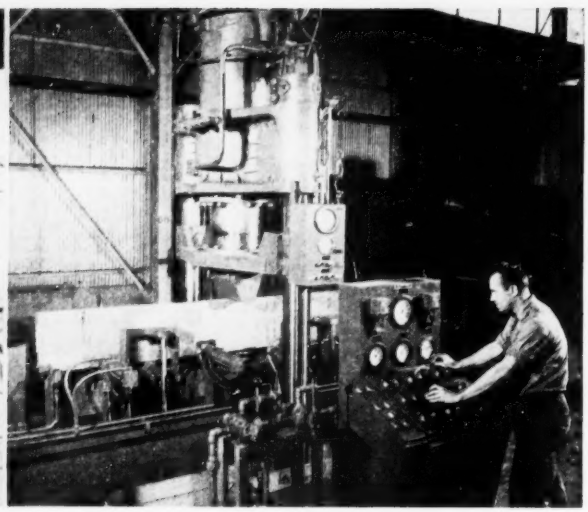
Clad strip is re-rolled and gaged upon leaving the Bliss cold mill. Darker strip on the outside edge of coiled material is unclad steel; will later be sheared



A specially-constructed straightening press is used to smooth out those billets requiring additional accuracy. Contact between the copper and steel must be very even

hydraulic straightening press which takes out kinks in imperfect billets, assuring an even surface on both sides which is necessary for the proper bonding of the copper and steel.

Billet assembly table uses a combination of magnetic and suction transferring techniques. Suction cups pick up a copper slab and place it on the assembly table. A magnet then lifts the steel billet and places it gently over the copper slab. A second copper slab is placed over the billet.

Prior to the assembly, the steel billets are sent through a grit blasting machine with a specially designed exhaust system. This system re-circulates the shot through a screening device which automatically removes particles that have become too small for effective cleaning.

Fusion Welder—To assure proper bonding of the copper and steel, steel channels made at the Superior plant are welded to the sides of the steel billet in an unusual welding operation.

Machine to perform this operation is a continuous fusion-welding machine, said to be the only one of its kind. It contains two welding heads on each side, and welds in a horizontal position. Unlike other welding machines in which the welding heads move across the work, in this specially designed welder, the apparatus remains stationary while the work moves between the welding heads.

After the welding, the channels are closed over the copper, clamping it in position over the billet for the subsequent hot rolling. Billets processed in this manner average about 120 inches long, with a width of 17½ inches, thickness of 3½ inches. Weight of the billet is approximately 1½ tons. Assembled, the clad billet is 4⅞ inches thick, which is reduced by subsequent hot and cold rolling to 0.030 inch. Length of the coiled clad strip after the final cold rolling is 1680 feet.

Two Bays—Superior's new plant can be best visualized if it is thought of as two long aisles or bays, separated by supporting roof pillars. The first of these is devoted to storage of billets and copper slabs and billet-cladding machinery. The second bay contains the continuous annealing and pickling facilities and the cold finishing mills. Largest of these is the Bliss 3-stand, 4-high cold mill. A four-man crew is assigned to the operation of the Bliss cold mill which rolls the copper-clad strip within an accuracy range of one-half thousandth of an inch.

The continuous annealing and pickling line is interesting in that it is somewhat longer than would be ordinarily needed for the processing of clad steel strip. In designing the plant, provision was made for the possibility of stainless steel processing. As a result, the clad strip as it leaves the annealing furnace travels a greater distance to reach the pickling bath. This distance is open space on the floor which may some day be allocated to another pickling tank should the plant be converted to stainless production.

Speed Important—Speed of the Superior continuous annealing-pickling-cold-rolling line is variable according to production requirements, but company officials admit that operating speed is a big factor in the potential capacity increase from 30,000 to 80,000 tons per year.

Building has galvanized steel roofing, and aluminum siding, and has its own power station with a 5-million-watt capacity. Installation of equipment was handled by the Eichleay Corp., Pittsburgh, and included the setting up of air compressors and auxiliary boilers in a utility room adjacent to the new building. Also outside the building are two 100 000 and three 15,000-gallon oil storage tanks. Both the annealing furnace and the boilers are oil-fired.

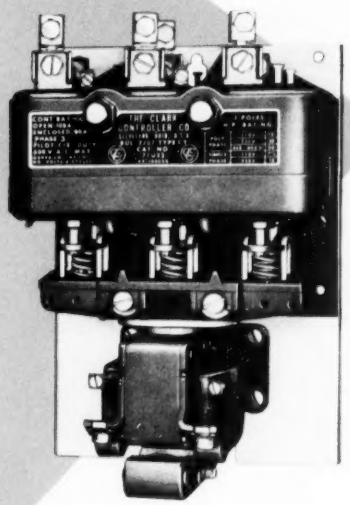
Ordnance Contract—Acid for the pickling tanks is supplied by five 6600-gallon sulphuric acid gravity feed tanks set up outside the build-

As New as Tomorrow!

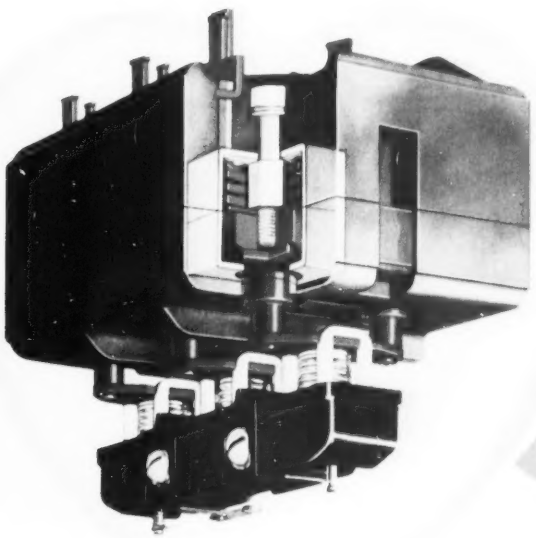
CLARK TYPE "CY" STARTERS

In Sizes 2 and 3, an entirely new method of arc quenching is employed. The arc is constantly forced to rotate, never striking the same place twice. This insures longer contact life as pitting and wear are reduced to a minimum.

Sizes 0 and 1 use the same general Mill Type construction as the larger sizes. Millions of trouble-free operations in all types of heavy duty applications mark the use of CLARK TYPE "CY" STARTERS.



NON-REVERSING SIZE 2
TYPE "CY" STARTER
OPEN TYPE



THE WORKING HEART OF THE CLARK TYPE "CY" STARTER

Cut-away view showing magnetic circuit, arc shield and blow-out coil. The top of the Arc Chamber is closed. This prevents accumulation of ionized gases between wiring terminals. Phase to Phase failures are thus minimized.

Ⓐ

ENGINEERED ELECTRICAL CONTROL

THE CLARK CONTROLLER CO.

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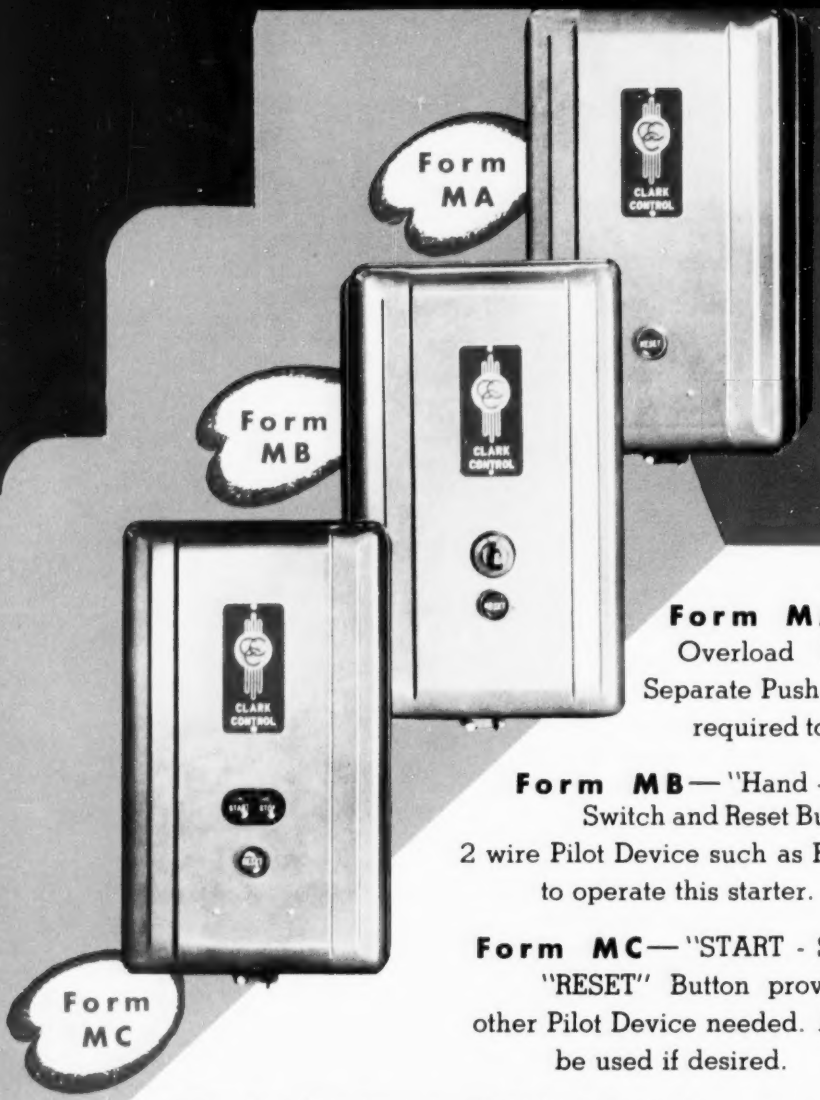
CLARK TYPE 'CY' STARTERS

Available in 4 Sizes and 4 Forms



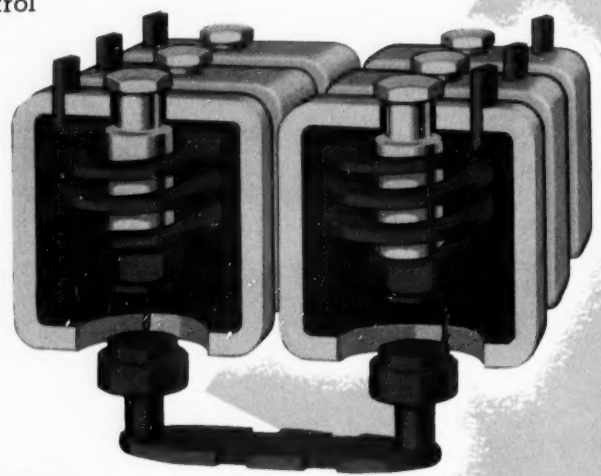
Form MA— Externally operated Overload Reset Button in cover. Separate Push Button or other Pilot Device required to operate this starter.

Form MB— "Hand - Off - Automatic" Selector Switch and Reset Button in cover. Separate 2 wire Pilot Device such as Float Switch must be used to operate this starter.

Form MC— "START - STOP" Push Button and "RESET" Button provided in cover. No other Pilot Device needed. Additional Push Buttons may be used if desired.

For the first time in Electrical Control history, strong twin multi-turn magnetic blow-outs are combined with twin break contacts in economical space.

The arc is extinguished by the effect of the blow-out coil concentric with the contact. The arc is forced to rotate, moving continually from a hot to a cold spot—minimizing burning and pitting of contacts.



That's WHY
You ought to TRY
Clark Type "CY"!

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1146 EAST 152ND STREET, CLEVELAND 10, OHIO

ing. Further space saving on the plant floor is effected by locating lubricants and coolants for all machines in a room under the plant.

Total expenditure was $7,757,865, and the new plant will be operated under a unique contract between Superior and the Ordnance Corps. Contract gives the government first call on production of the new plant, but the facilities may be used for commercial purposes when they are not required for Ordnance production. Under terms of the contract, Superior will pay the government rental on all government-owned facilities used for commercial production.

Roebling's Speeds Up Testing

John A. Roebling's Sons Corp., wholly-owned subsidiary of Colorado Fuel & Iron Corp., has installed a pneumatic tube system between its nine open-hearth furnaces and the testing lab at the Roebling, N. J., steel mill. The tubes, installed by Lamson Corp., Syracuse, N. Y., carry furnace samples about a tenth of a mile in 20 seconds.

Once in the lab, they are analyzed in two or three minutes and returned via the tubes to one of three pickup stations complete with carbon analyses. With this method, "several samples may now be checked in the time it formerly took to check one," says Charles R. Tyson, executive vice president of Roebling's.

Offers Gas-turbine Engines

Pratt & Whitney Aircraft's gas-turbine engine, the PT2F-1, is being offered for sale to airlines in this country and abroad for the first time in the company's history, it was announced recently.

Axial-flow engine, a commercial version of the company's T-34 turboprop engine, is rated at 5600 horsepower. It has an all-steel compressor. Gas-turbine delivers about 90 per cent of its power to the propeller and the remainder in jet thrust. Fuel consumption compares favorably with that of high-powered piston engines in the highest power ranges. Cruising speed is considerably higher than that of conventional piston engines.

Study "Extra" Jet Howl

Wisconsin U. engineers try to find effects of pressure oscillation in jet combustion

THAT howl you hear from a jet plane zooming across the sky may bother you, but there's another "howl" hidden in that jet engine which can worry the pilot much more, and which is now the center of close study and investigation by University of Wisconsin engineers.

With a jet power setup in a laboratory adjoining the Mechanical Engineering building on the UW campus, two Wisconsin mechanical engineering professors and a graduate student assistant are producing jet engine temperatures that reach upwards of 3500° F, and a jet howl that makes you deaf in a few minutes—all for the purpose of investigating that hidden howl and exactly what effects the heavy oscillation vibrations that produce it have on jet engines and power.

What It Is—Hidden howl itself is technically known as a variable frequency pressure oscillation in the gas stream, frequently reaching high amplitude noise and vibration levels in the engines. It has been established by engineering researchers that the "howl" condition is dependent upon the combustion process, but its exact mechanism is as yet unknown.

Recent data obtained on this project have indicated that there exists at all times in steady jet engine fuel-air flow combustion a flame temperature oscillation, its amplitude and frequency being dependent upon the fuel-air ratio. These temperature oscillations may reach frequencies comparable to the resonant frequency of the exhaust system or other mechanical parts, resulting in a very noticeable rise in "howl" amplitude and engine vibration.

Study Fuel Conditions—At the present time, research at Wisconsin is being conducted in an effort to ascertain the effect of inlet fuel conditions on these flame temperature oscillations, the Wisconsin researchers explain.

It is hoped that the results of these studies will shed further light upon the origin of the second hidden "howling" combustion and its linkage with the gas stream. The researchers hope that it will show the way to a more effective fuel-air ratio for jet engines, to gain the most powerful performance possible with the least howl and engine vibration.

The Wisconsin research is being conducted on a single jet engine "combustor can" mounted in a pipe through which air is forced. Air flow is supplied by a supercharger driven by a war-surplus aircraft engine. The combustor is equipped with an instrument capable of measuring rapidly varying temperatures in a luminous flame. With the aid of an oscilloscope in conjunction with a drum camera, high speed flame temperature data is recorded for later analysis. Further instrumentation is in use for the measurement of air flow, fuel flow, and exhaust gas temperatures.

Conditioned Improvement

Both productivity and employee relations improved when two pulpits and five crane cabs in this Western Pennsylvania steel plant were air conditioned. Lintern conditioners keep air at about 80°F in all five cabs

Issues Booklet on Corrosion

"Positive Corrosion Control" is the title of an eight-page booklet published by Bart Mfg. Corp., Belleville, N. J. It discusses the Bart Lectro-clad process, uses for nickel-lined steel pipe for corrosion protection, test results over a period of 10 years and descriptions of applications in petroleum fields, organic and inorganic chemical and allied industries.

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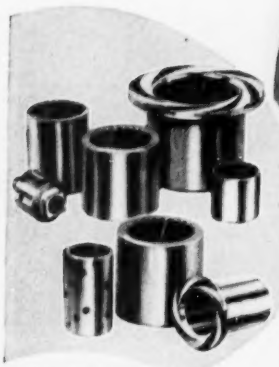
STANDARD SIZE
Johnson Bearings
they save you TIME and MONEY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ELECTRIC MOTOR

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LEDALOYL (Self-Lubricating)

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Cold Changes Properties

Steels usually become stronger, harder, ASTM told, but ductility and toughness varies

METALLURGICAL factors that affect low-temperature behavior of ferrous materials were discussed recently by C. H. Lorig of Battelle Memorial Institute, Columbus O., before a meeting of the American Society for Testing Materials in Philadelphia.

Steels, in general, become stronger and harder with decreasing temperature, but they divide into two groups with respect to effect of temperature on ductility and toughness, he said.

Principal difference between these groups is their atomic structure. Ductile steels are austenitic; brittle-sensitive steels are invariably ferritic, although certain austenitic steels become brittle sensitive at low temperatures.

Major Problems—Because they become notch sensitive with temperature reductions, the ferritic steels provide the major problems arising from low-temperature embrittlement. Under impact, they are apt to fail at low temperature more often than indicated by the usual tension test.

Change from ductile to brittle behavior with temperature is affected by composition of the steel, by steelmaking and deoxidation practices, by heat treatment; by aging effects, by grain size, by hot and cold working and other fabricating techniques, as well as by other metallurgical variables.

Available Grades—A whole gradation of ferritic steels is available for low-temperature service, ranging from ordinary bessemer grades, which are generally brittle in the notched-bar test at room temperature, to fine-grained, fully quenched and tempered, low-alloy grades which may still retain their notch toughness to −300° F.

Carbon has been shown to increase the ductile to brittle transition temperature. Its effect is modified by presence of other elements. Manganese, for example, tends to offset effects of carbon. There is a definite trend to use higher manganese contents in low- and me-

How to solve 39 PRODUCTION PROBLEMS with Mead Air Devices

SEE how to use standard Mead units to make automatic or semi-automatic machines!

New 16-page Mead PHOTO-BOOKLET presents actual examples in pictures and text of 39 different, tough production problems solved by various combinations of Mead Air Operated Devices. This interesting booklet shows how to:

(1) De-burr small parts fast **(2)** Press 3 components together **(3)** Tap die cast knobs **(4)** Insert rubber discs into metal cups for insecticide "bombs" **(5)** Swage hubs to hypodermic needles **(6)** Ream center hole in valve plate **(7)** Broach 2 internal slots in brass valve inserts, handling 4 sizes **(8)** Press filters into copper shells and indent dimple in shell **(9)** Tap 2 holes $\frac{5}{32}$ in brass brush holders. **(10)** Drill and tap a 1/4-20 hole 9.16 deep then ream "bell-mouth" in stainless steel forging **(11)** Drill and ream a hole to controlled depth in brass valve body. **(12)** Drill No. 52 hole thru end of solid graphite pencil. **(13)** Press plastic liners into perfume bottle caps **(14)** Drill cast iron gas burners **(15)** Drill $\frac{1}{4}$ hole thru steel axle of fishing reel **(16)** Carry copper rods thru series of gas flames to braze special tips to lower ends. **(17)** Chamfer hole in spark-plug bodies approx. 3,600 per hour **(18)** Swage steel ball into brass nose of ballpoint pen approx. 3,600 per hour **(19)** Assemble patented brass couplings and flare neck into nut to simultaneously form fluid-tight seat **(20)** Drill twin holes in chain-saw teeth **(21)** Counter sink both sides small washers, wheels, rollers approx. 4,000 per hour. **(22)** Press shafts, bushings into plastic knobs **(23)** Drill and tap 5-40 threads in rectangular brass electric terminals, approx. 2,400 per hour **(24)** Crimp together 2 thin spring members of pen assembly **(25)** Press brass shells over cast iron cores of doorknob assemblies **(26)** Crimp saddles to plastic radio tube sockets **(27)** Stamp trademark on brass plugs approx. 3,600 to 4,000 per hour **(28)** Press ferrules on wood handles **(29)** Assemble paper hangers' tool roller to yoke by inserting pin thru collar **(30)** Feed, spin finials onto screw of lamp shade holder **(31)** Crimp eyelet and ring on pen barrel **(32)** Drill and tap 2 holes 8-32 in aluminum BX connectors **(33)** Drill $\frac{1}{8}$ hole in aluminum part, chamfer both top and bottom of hole, approx. 2,000 per hour **(34)** Cap cathode tubes for TV sets at 3,200 per hour **(35)** Fill pen tubes with ink, insert ball point assembly at one pass **(36)** Bend precut copper tubes 90° at 4,000 per hour **(37)** Drill 2 holes in brass castings, fed to 2-spindle drill head **(38)** Hold plastic bead, drill hole, eject **(39)** Drill bushing for 2 size clevis pins.

MEAD SPECIALTIES COMPANY, Dept. SM-73, 4114 No. Knox Ave., Chicago 41, Ill.

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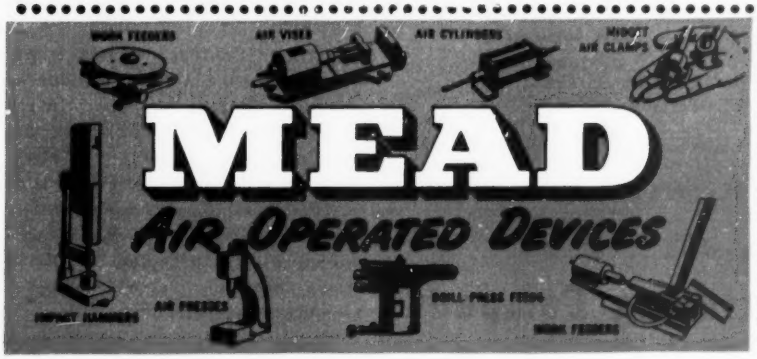

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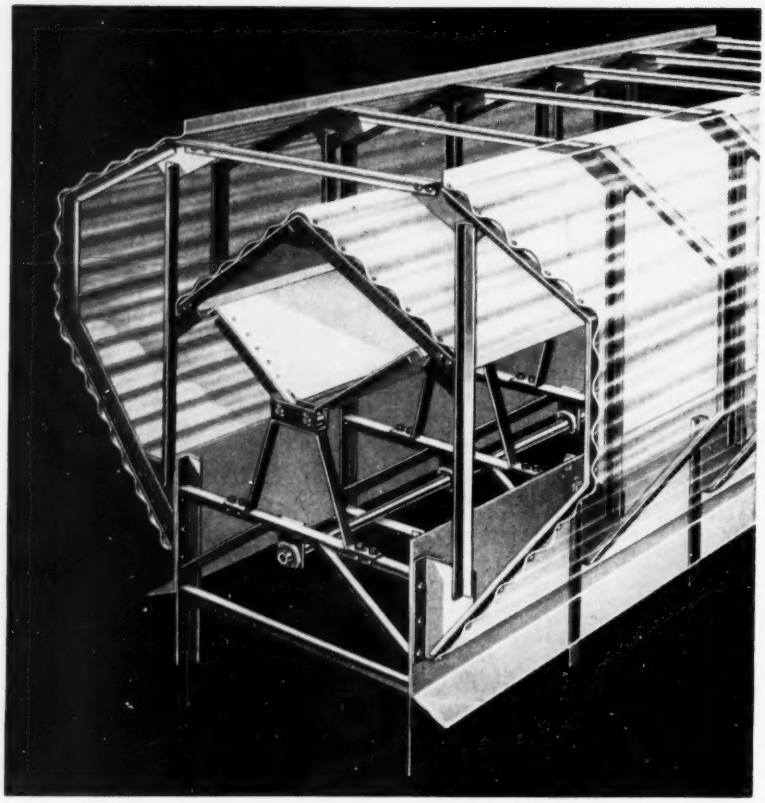


EFFICIENT BURT MONOVENT "ROOF VALVE" VENTILATORS

Functioning as a gigantic air valve for the entire roof line, Burt Monovent Continuous Ridge Ventilator exhausts impure air from the entire structure by gravity—quickly and economically.

Few moving parts and sturdy, simple construction assure years of trouble-free operation. It is particularly efficient for heavy industry—in steel mills, foundries, forge shops, etc.

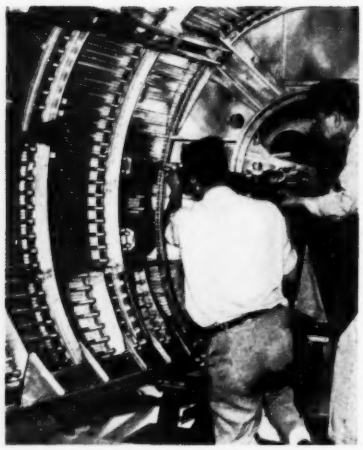
Standard production sizes from 4″ to 96″ width handle almost any application. Actual installations in industry range from continuous runs of one foot to 1,000 feet.

See Sweet's for complete Burt Monovent data or write for Bulletin SPV-6.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET-METAL SPECIALTIES

The Burt Manufacturing Company

905 S. High St., Akron 11, Ohio



Spotwelding Stainless

Welders at Solar Aircraft Co., San Diego, spot-weld a huge engine nacelle for the Lockheed P2V-5 Neptune. Nacelle skin is made of Armco type 302 stainless steel, each barrel weighing only 242 pounds. Despite this light weight, each barrel takes the shock produced by a 3500-pound engine

dium-carbon steels to shift notched-bar fracture transition to lower temperatures.

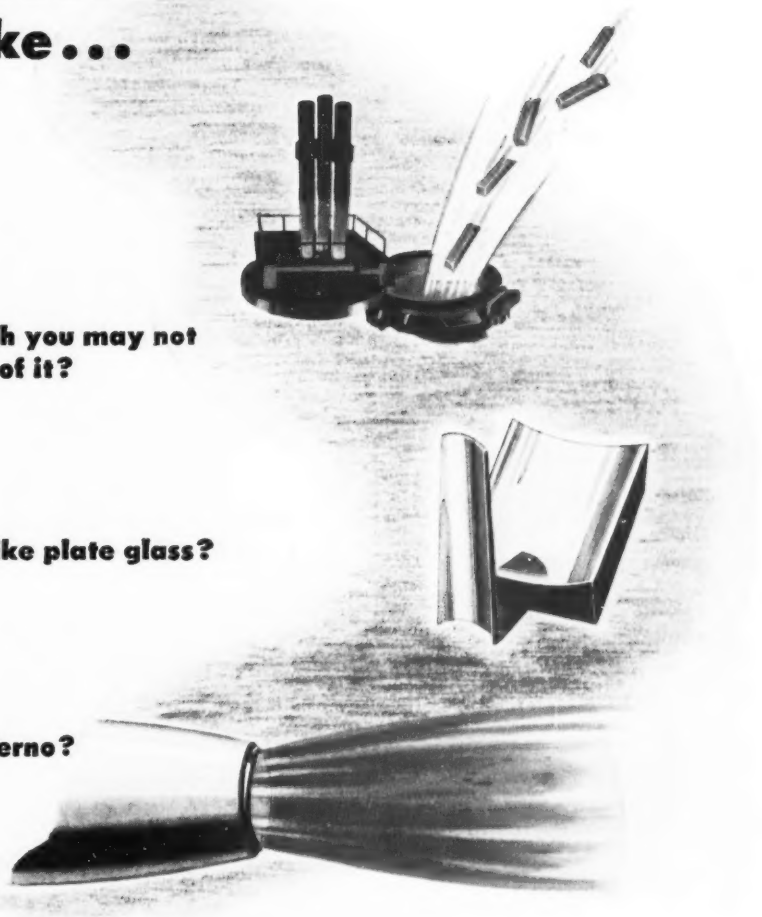
Change Oxygen—Many of the elements which change the nature of the oxygen in steel, such as strong deoxidizers, aluminum, zirconium and titanium, for example, are extremely effective is offsetting the detrimental influence of oxygen on notch toughness. Of the group, aluminum, of course, is the principal element used to deoxidize steel. Amounts as small as 0.03 per cent are effective, while amounts in excess of those required for deoxidation may have a powerful effect in reducing transition temperature still further.

Nickel is generally accepted as beneficial toward inducing low-temperature toughness, particularly when carbon content of the steel is kept low.

Another Control — Heat treatment provides control of the microstructure. It is one of the primary metallurgical factors affecting the low-temperature behavior of steel. Steels in fully quenched and tempered state offer greatest resistance to notch sensitivity. Slack-quenched structures and pearlite in steels normally provide higher transition temperatures.

Temper brittleness, which may

Will the product you plan to make...



.....need

an alloy so tough you may not yet have heard of it?

.....require

a forged finish like plate glass?

.....face

a man-made inferno?

You may even have a twist or two of your own to add to the problem the Jet Division helped solve for jet aircraft engine builders . . .

The "buckets" (paddles) on the turbine rotor at the rear of a jet engine whirl around about 10,000 times a minute, pulsed by a white-hot blowtorch of flame. To withstand this roaring inferno, the bucket surfaces and curves must be forged even smoother than glass. They must be made of an alloy tougher than the toughest steel. They must "take" this red-hot ride for hours without stretching out, or "creeping", from centrifugal force and heat.

The Jet Division makes more buckets for America's engine builders than any other manufacturer. We forge super-strength alloys into finished parts so smooth and accurate that they need no costly, lengthy finish-machining or polishing.

If your product or product-to-come must meet one of these conditions . . . two . . . three, or, even a brand new one, it can pay you to get in touch with us now.

JET DIVISION

Thompson Products, Inc.

CLEVELAND 17, OHIO

accompany the tempering process after quenching, can detract considerably from low-temperature toughness of heat-treated steel. Both quench aging and strain aging are factors that increase the notch sensitivity of certain steels.

Grain Size—Ferrite grain size is an important factor affecting degree of notch toughness. An increase in ferrite grain size of one ASTM grain-size number raises the transition temperature of low- and medium-carbon steel 30° F.

Precut Transformer Coils

Important characteristics can be varied to suit the user's operating conditions

PRECUT, preformed core for small power transformers, one that improves performance and reduces transformer size and weight, is announced by General Electric Co.'s power transformer department.

With this preformed core, made of oriented, cold-rolled silicon steel, department engineers say they have a greater amount of flexibility in designing some of the important characteristics of a transformer. The losses, exciting current, noise level, weight and dimensions, can be varied to best suit the user's operating conditions, they report.

INSTALLING A WINDING
. . . size and weight are reduced

Cold-Rolled Laminations — This is done by using a minimum number of joints, an annealing process which removes mechanical strains introduced when the core is formed, and a unique clamping structure.

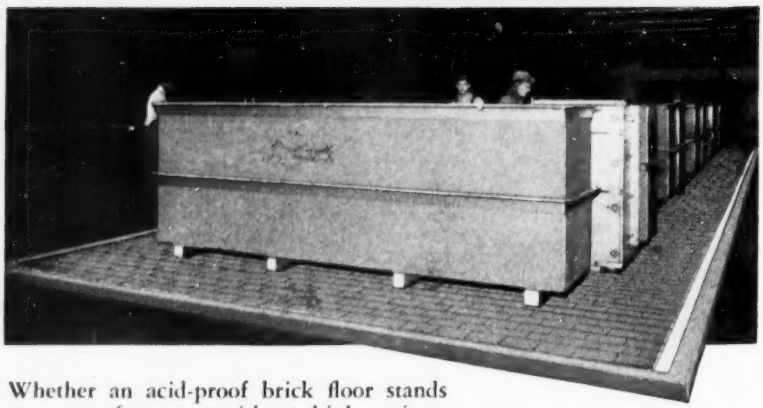
In manufacturing the core, cold-rolled steel laminations are cut in progressively decreasing lengths by an automatic shear, then stacked into a ring. A hydraulic press forms the ring into a rectanglar shape.

After being banded securely in this shape, the core section is annealed in an electric furnace to fix its shape permanently and remove strains. In final assembly, two core sections are bolted together and supported in a special clamping structure designed to prevent strains on the laminations.

Low-Strain Circuit—The steel used in the cores, called Corisil, was developed in 1937 by G-E for use in distribution transformers. It required development of the low-strain efficient magnetic circuit of the preformed core to take full advantage in power transformers of the highly directional properties of this special steel.

FOR LESS MAINTENANCE OVERHEAD

put Durisite and Brick UNDERFOOT



Whether an acid-proof brick floor stands up year after year without high maintenance costs depends mostly on the joints between the bricks. The thinner the joint the better the chance for long, trouble-free life. But with ordinary bonding mortars you can't get a joint much thinner than ¼".

Durisite *acid-and-alkali-proof* cement, however, bonds brick double-tight with *extra thin* joints . . . $\frac{3}{32}$" or less. Not only does Durisite make a thin, strong joint, but it makes a dense, non-absorbent joint.

Durisite is a resin-type cement, sets quickly by internal chemical reaction, is non-toxic, non-explosive, non-inflammable.

U. S. STONEWARE

PROCESS EQUIPMENT DIVISION, AKRON 9, OHIO

FOR A FLOOR YOU CAN INSTALL, AND FORGET, INSIST ON "U.S." TRIPLE-CONSTRUCTION
4" to 6" rigid concrete sub-base
Resilon corrosion-resistant protective membrane
"USSCO" Acid Brick bonded with double-tight Durisite thin joints.

The U. S. Stoneware Co. can supply all necessary materials for installation by your own workmen of a "triple-construction" acid-and-alkali-proof floor, or if you desire, we can handle the entire job, including labor and materials.

"THAT'S OUR STEEL STOCKROOM"

The gentleman is referring to the Carpenter Mill-Branch Warehouse in his locality. Have you ever thought about making your nearest Carpenter Warehouse *your* steel stockroom, too?

When you do, you'll make the profitable discovery that your Carpenter Mill-Branch Warehouse is not only stocked with tool, alloy and stainless steels... but puts at your command one of the most comprehensive services on steel ever devised.

And *every* service is designed to free you from more of your steel problems... lets you concentrate on your one important job of making *more* and *better* products at a lower unit cost.

There's the man on the warehouse order desk ready to give quick information on sizes, prices and grades. There's professional in-the-shop help on tooling and production problems... service literature to help you get the most from every pound of steel you use... as well as Metallurgical Counsel available to you direct from the Reading Mill.

Give your nearest Carpenter Mill-Branch Warehouse or Distributor a chance to prove how this comprehensive Mill-Branch Warehouse Service can pay off for you. Simply pick up your phone, call the number and be ready for action! The Carpenter Steel Co., 139 West Bern St., Reading, Pa.

Carpenter STEEL

Mill-Branch Warehouse Service

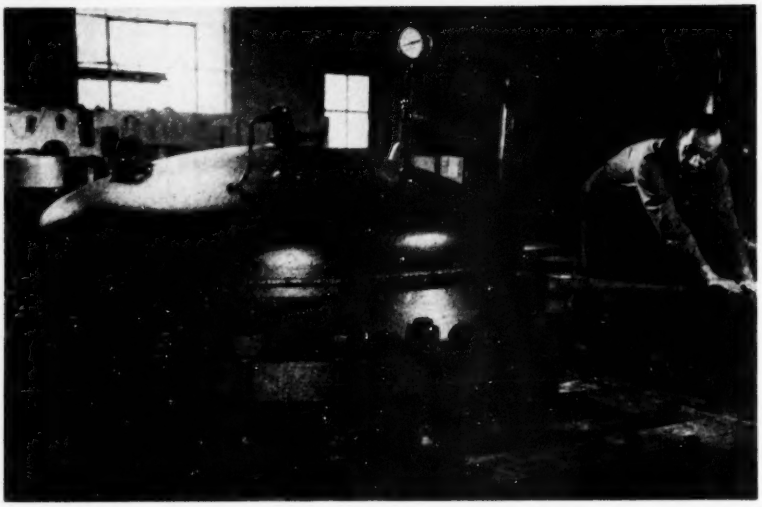
SPECIALTY TOOL • ALLOY and STAINLESS STEELS

Impregnation of Powder Metallurgy Parts . . .

IMPROVES CORROSION RESISTANCE

Sintered metal powder parts give improved corrosion resistance if impregnated with polyester type resin prior to plating. Also cuts down on other finishing troubles

By WILSON N. PRATT
Director of Research
American Metaseal Mfg. Corp.
New York



Batch type pressure vessel for impregnating powder metal parts. A vacuum pump removes air from the autoclave, and any pore connected to the surface of the parts is evacuated. Pressure forces the impregnant into the pores

PLATING AND FINISHING of powder metallurgy parts presents difficulties due to their porosity. Cleaning and plating solutions penetrate the pores and cause corrosion and exudation of salts. This results in plating finish failures, and gives rise to trouble from spotting out, freckling, and bubbles.

In addition to plating and coloring problems, porosity interferes with the general use of powder metallurgy parts in applications where there are pressure tight requirements.

Porosity is due to the open spaces left between the metal powder particles that are never completely closed during the conventional consolidation technique of pressing and sintering. It may be useful or detrimental. If the porosity is useful, it is usually filled with oil or some liquid to act as a lubricant or possibly to act as a corrosion preventive. Porous bearings impregnated with oil are an example of this type of product. In a few cases, the porosity is not filled but is used because of its permeability to liquids or gases, as in filters.

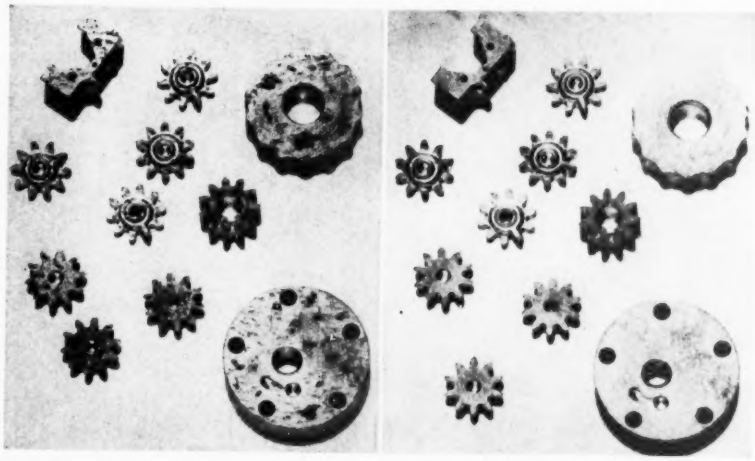
Fill up Pores—Nonmetallic impregnation of sinterings has been studied using substances of various types, including silicones, synthetic resins which polymerize in condensation reactions, thermoplastic resins and contact pressure casting resins. Other systems using inorganic compounds, such as sodium silicate (water glass), have been studied.

While castings have been successfully impregnated for years, the impregnation of sinterings prior to plating and other finishing operations proved to be more difficult. Here are some reasons why: After filling the pores in the parts it is necessary to wash the impregnant from all surface areas. Impregnant remaining in the pores after washing may be exuded or bled out of the pores during the curing cycle. Sometimes it has been necessary to give sinterings repeated shots of impregnant to attain reasonable pore filling.

Progress—After more than two years of development work, American Metaseal Corp. has developed a method of impregnating sinterings which fills voids permanently and invisibly so that parts can be successfully plated with no subsequent spotting out, freckling, blistering or other corrosive reaction. Internal corrosion is prevented and parts are made pressure tight so that they will hold pressures of over 5000 psi.

A number of important characteristics were engineered into the impregnating compound. One requirement is 100 per cent solids. This is important because if any solvent is present it will pass out of the pores and carry the impregnant with it, leaving behind open areas which are pores. In order to make sure that the finest porosity is penetrated, the viscosity of the impregnant must be just right. If the impregnant is too heavy, penetration may not take place. To make sure that the impregnant thoroughly wets the metal it should be polar in nature. This wetting effect, due apparently to electron attraction, promotes capillary action and assists penetration.

Resin Properties — Stability to metals is another property required of the compound. Some metals, particularly copper, inhibit or poison copolymerization of some synthetic resins. This means that the



Pinion gears and other adding machine sintered iron parts (left) cadmium plated in ordinary manner show corrosion after 10 days atmosphere exposure test. (Right) Same parts which were sealed with polyester type impregnant before plating show no corrosion or plate failure after five months test

compound should be copper stabilized. The impregnant also should have thermosetting characteristics. This implies in relation to synthetic resins that it will not melt but will decompose on the application of higher temperatures. Normally thermosetting resins will be more solvent resistant than thermoplastic resins.

The impregnant must be emulsifiable by water base cleaners. This is important during the cleaning cycle to insure removal of the surface contaminant without removing the impregnant in the pores by solvent action.

Here It Is—The material developed to fill powder metallurgy pores is a thermosetting polyester-styrene copolymer. This plastic is inert, noncorrosive and resistant to acids, alkalis, salt water, alcohols, glycols, gases and all solvents. It withstands temperatures of from −75 to 400° F.

The method of application of the impregnant is the batch type vacuum pressure scheme. Parts are baked to remove moisture if they have been at room temperature for any length of time. If parts have been stored, they are cleaned and then baked.

Remove Air — Parts are then cooled to room temperature and placed in baskets. These baskets are placed in pressure vessels called autoclaves. The lid is clamped down and vacuum is applied for a minimum of one half hour. This removes air from the voids in the metal powder sinterings. Object: To get literally as near nothing in the pores as is possible. The liquid impregnant is drawn in without breaking the vacuum until the parts are completely covered. Pressure is applied by filling the space at the top of the pressure vessel with compressed air. This forces the impregnant into the pores. Pressure usually is around 100 psi and time of treatment is normally one half hour minimum. The pressure is released and the parts are removed and washed.

Clean and Cure—Washing cycle is not critical as to time and is generally automatic. The emulsification of the material from the surface of the parts will not remove the impregnant from the pores because turbulence is necessary in order that an emulsion be formed and as no turbulence can be produced in micropores no emulsion can be formed.

After cleaning, the treated parts are cured. By the application of heat the compound in the pores is copolymerized into a solid which has the characteristics of a thermosetting resin. Curing, as is normally done in oven heating, results in exudation from the pores to the surface where hardening takes place. This gives excessive cleaning cost. Such exudation can be completely eliminated by curing in a liquid. For this reason liquid cure is recommended for all powder metallurgy parts.

No significant improvement in physical properties is produced by this process although the pores are completely filled with the cured impregnant. The improvement lies in the fact that the pores no longer exist as far as liquids or gases are concerned. Powder metal parts can be plated and will not corrode internally.

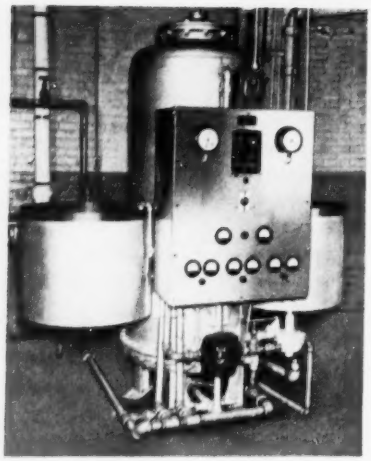
This brass sintering was sealed before giving it a decorative finish in a chemical blackening solution

Paper Honeycomb Sandwich

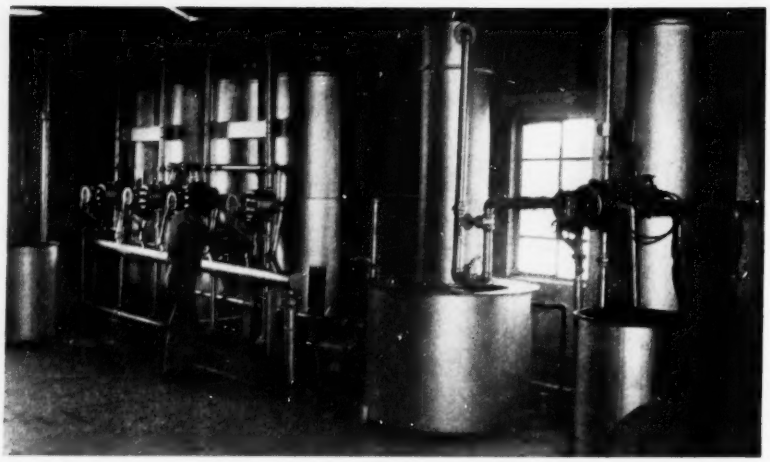
Aircomb, a new structural material with many applications, is being marketed by Douglas Aircraft Co., Santa Monica, Calif.

Product is a honeycomb structure of Kraft paper impregnated with a phenolic resin. It is sandwiched between thin facings of aluminum, stainless steel, magnesium, wood, plywood, plastics, or a whole host of other materials. Thicknesses range from 1/16 to 5 inches. Any length may be obtained.

Douglas claims the product, when properly paneled, is the strongest material in relation to weight now being manufactured. It is durable, fire and pest resistant and has excellent insulation and soundproofing qualities. A piece of steel of equal rigidity would weigh 16 times as much as Aircomb. Aside from applications in the aircraft industry, the product is being used for office furniture and by the building trades.



Fully-automatic, mono-column demineralizer capable of delivering 1200 gph of high-purity, mineral-free water. Signal indicates when regeneration resins are needed



Multi-column unit in large-scale aluminum appliance manufacturing plant. It's used in final rinse to prevent spotting, also in final rinse and sealing when anodizing

ION-FREE WATER

Makes Cents in Metal Finishing

Economies include reduction in amount of cleaning compound needed, elimination of hard-water precipitates and fewer cases of underfilm corrosion in enameling operations

By ANTHONY GIGLIOTTI
President
Penfield Mfg. Co. Inc.
Meriden, Conn.

METAL-FINISHING costs can be trimmed by using demineralized water for such things as enameling, plating, painting and polishing.

Here are a few of the reasons:

Less cleaning compound is needed. In fact, this saving alone may foot the cost of demineralized water.

Hard-water precipitates are eliminated. These unsightly streaks, water spots and discolorations increase rejects.

Underfilm corrosion in enameling is reduced. Hard-water impurities, such as calcium salts, may prompt complex chemical reactions which cling to metal surfaces.

Success Stories — Demineralized water has solved impurity problems for several firms.

Faced with an impurity tolerance of less than 50 ppm in his dye tank, a large appliance manufacturer turned to demineralized water with success in color and bright anodizing. For his color work, he uses it in brightening, rinse, dye, seal and final rinse tanks. His water costs range from 30 to 75 cents per thousand gallons as compared to $2 to $6 for the like amount of distilled water.

Another manufacturer of aluminum parts found that city water with hardness up to 300 ppm of dissolved solids and a high degree of alkalinity was hampering his crucial cleaning operations, especially before painting. Alkaline residue caused paint film to give way to pin-point blisters.

Before using demineralized water, a porcelain enameling plant had trouble with black specks, blisters in white coats and copper heads in ground coats.

Compact Package Units—Demineralizers require only a raw-water source and an electrical outlet. Falling into three basic types, mono, dual and multi-column units, they come in several semi-automatic and automatic designs with flow rates ranging from a few gallons to 5000 gph.

All have the same ion-exchange principles, but desirability of one over the other is usually dictated by: Careful analysis of raw water conditions, quantities of mineral-free water to be consumed and level of purity desired.

Generally, mono-column units are tops. Cation and anion resins are mixed together in a single column through which raw water is passed at a controlled rate of flow and subjected to multiple "ion exchanges." Water at the effluent has less than 0.05 per cent impurities and is essentially free of silica and CO_2.

Other Types — Water passes through a column of cation resins and then a column of anion resins in dual-column demineralizers. Effluent has a mineral content well under 10 ppm and often is safely around 5 ppm, depending, of course, upon raw water conditions. Decarbonators or degasifiers may be added to insure elimination of carbonic acid.

Multi-Column demineralizers have four columns, alternately containing cation and anion resins. Third and fourth columns remove weak ionizable impurities that have passed through first cation and anion columns. Impurities are under 2 ppm. The water has highly electrical resistance, free CO_2 is removed and silica is substantially reduced.

Difficult deep draws... made economically with

Weirzin

ELECTROLYTIC ZINC-COATED STRIP

Leading manufacturers throughout the country have chosen Weirzin for the many fabrication economies it offers. They have found Weirzin especially adaptable to deep drawing and forming because the zinc coating remains intact and of even thickness. It does not peel or flake and forms an impervious protective coating, safe from underfilm corrosion. But the economies that Weirzin offers do not stop here. Beneath the zinc coating is Weirton's cold-rolled steel, noted for ductility and uniformity of gauge—assuring you of ease-of-fabrication with minimum rejects.

When the job calls for difficult deep draws specify Weirzin and get the advantages of better quality and appreciable manufacturing economies.

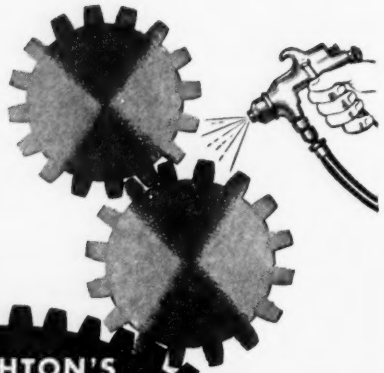
WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

you'll get a new idea of lubrication economy when you use



HOUGHTON'S *new*

TENAC

a really tenacious gear lubricant

. . . Highly adhesive heavy-duty lubrication for open gears and cables—on such equipment as presses, hoists, shears and cranes with exposed lubrication points

You can put Houghton "Tenac" to work on the heaviest external lubricating jobs and benefit greatly from its long-lasting, cost-saving service.

"Tenac" is a black, tough lubricant which rapidly forms a plastic film. It is fortified with special additives that give it exceptional adhesiveness. It is available in 3 grades—light, medium and heavy—all of which give you these additional advantages:

- No preheating necessary.
- Easily applied by brush, spray, drip feed, or swab.
- Fast-setting film won't become brittle or flake off.
- Has high lubricity and oiliness.
- Water resistant—corrosion preventive.
- Remains fluid in storage.
- High penetration ability.
- No chlorinated or toxic dilutions.
- High flash point reduces evaporation and fire hazard.

AVAILABLE IN 3 GRADES:

TENAC L (light)
TENAC M (medium)
TENAC H (heavy)

Try Tenac for heaviest duty. See your Houghton Man for full details and prices—or write to E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

TENAC LUBRICANTS
. . . products of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

CALENDAR
OF MEETINGS

July 23-24, Truck-Trailer Manufacturers Association Inc.: Annual summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington. Managing director: John B Hulse.

August 17-19, Society of Automotive Engineers: International West Coast meeting, Georgia hotel, Vancouver, B. C. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 19-21, Institute of Radio Engineers: Western electronic trade show and convention, Civic auditorium, San Francisco. Business office: 1355 Market St., San Francisco 3. Business manager: Heckert Parker.

August 23-26, National Automatic Merchandising Association: Annual convention and exhibit, Hotel Conrad Hilton, Chicago. Association address: 7 S. Dearborn, Chicago. Secretary: C. S. Darling.

September 1-4, American Institute of Electrical Engineers: Pacific general meeting, Hotel Vancouver, Vancouver, B. C. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

September 8-11, American Chemical Society; Fall meeting, Hotel Conrad Hilton, Chicago. Society address: 1155—16th St., NW, Washington 6. Assistant secretary: R. M. Warren.

September 10-12, Rocky Mountain Management Club: Rocky Mountain industrial exposition, University of Denver arena. Club address: 1031 15th St., Denver 2. Executive secretary-treasurer: Harold S. Craig.

September 13-16, Electrochemical Society Inc.: Fall meeting, Ocean Terrace hotel, Wrightsville Beach, N. Carolina. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

September 14-15, American Hot Dip Galvanizers Association, Inc.: Semi-annual meeting, Statler hotel, Cleveland. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary-treasurer: Stuart J. Swensson.

September 14-16, Allied Railway Supply Association: Annual meeting, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: Charles F. Weil.

September 20-23, Packaging Machinery Manufacturers Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute address: 342 Madison Ave., New York 17. Secretary-treasurer: Helen L. Stratton.

September 20-23, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual convention, Hotel Waldorf-Astoria, New York. Institute address: 402 Albee Bldg., Washington. Executive secretary: George T. Underwood.

September 21-22, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

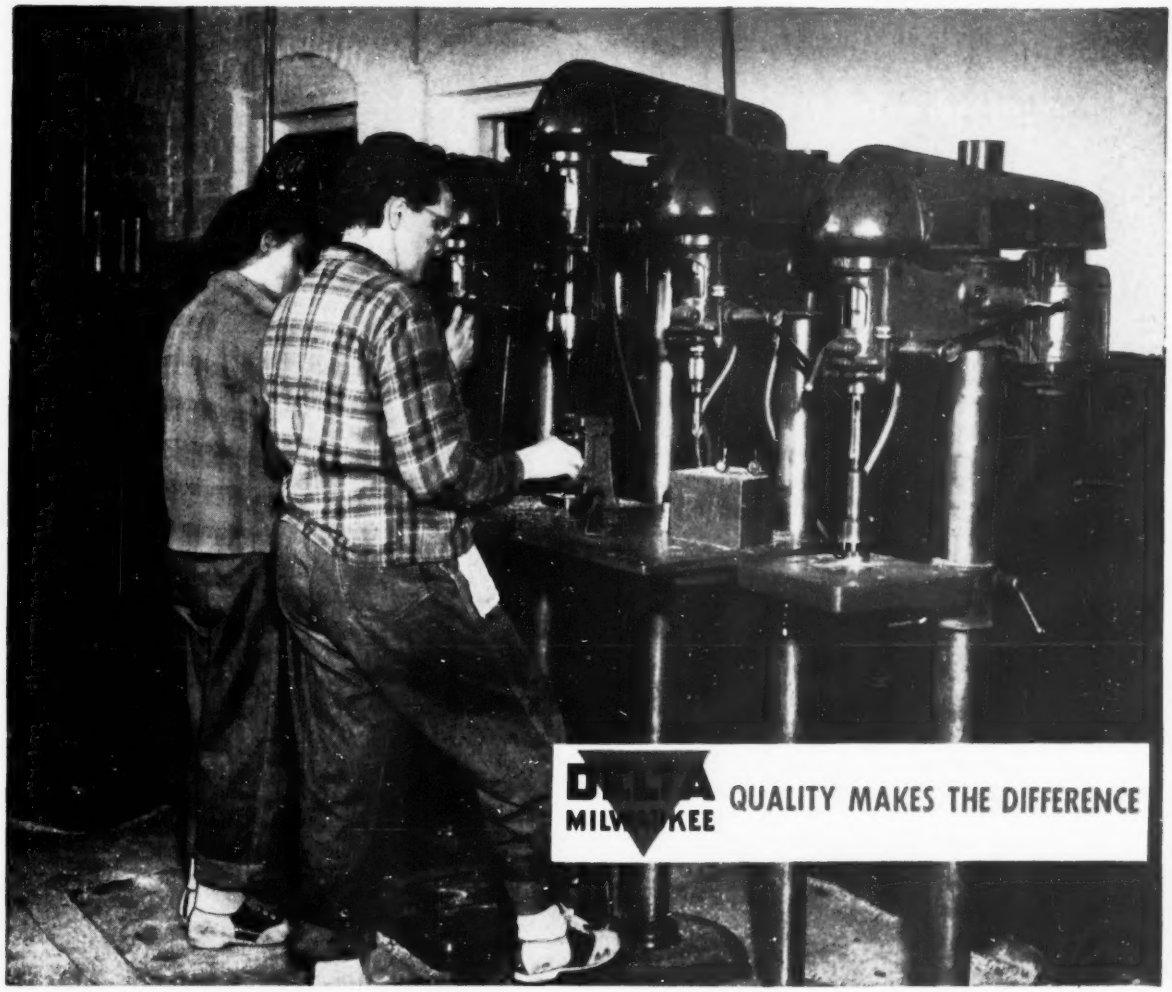
September 21-23, Truck Body & Equipment Association Inc.: Annual meeting, Sheraton-Gibson hotel, Cincinnati. Association address: 1122 DuPont Circle Bldg., Washington 6. Executive manager: Arthur J. Nuesse.

September 21-24, American Mining Congress: Annual metal and nonmetallic mineral mining convention, Olympic hotel, Seattle. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

September 21-25, Instrument Society of America: National instrument conference and exhibit, Hotel Sherman, Chicago. Society address: 1319 Allegheny Ave., Pittsburgh. Manager: P. V. Jones Jr.

September 23-26, National Association of Foremen: Annual convention, Milwaukee. Association address: 321 W. 1st St., Dayton 2, O.

September 28-October 1, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. J. Ess.



TELL US, MR. CURTIS——

Why did you buy 200 DELTA Drill Presses?

"Three vital advantages built into Delta Drill Presses explain why we use 200 of them," says Charles Curtis, Production V. P. of Copeland Refrigeration Corp., Sidney, Ohio . . .

"1. **PRECISION**—a must. We fight 'tenths' in this business; normally, .002" undersize is scrapped.

"2. **VERSATILITY**—you can mount Delta drill presses upside-down, sideways, gang them in numerous ways.

"3. **LOW INVESTMENT**—numerous permanent set-ups ready for all operations are vastly cheaper than a few that involve set-up time, labor and scrap cost resulting from constant changes of set-ups. We make a variety of plates, heads and parts, and can make a run on one piece simply by taking jigs and fixtures off the shelf.

Direct labor saving of $24,000 a year on one operation

"As for special tools, here's one that out-performs a $16,000 radial drill press. We cut a Delta drill press pedestal in two, put an extension between, mounted the unit on an idle heavy base, fastened a swivel on each half-pedestal, mounting the drill head—and obtained a knee action that does all the radial drill did, only much better. The special Delta rig costing not over $300, operates at 2400 RPM as against 400 RPM; drills more than 200 pieces per day, as against 30-35 pieces; uses 3 men (always ahead of schedule) as against 7 men (always behind)—for a two-shift direct labor saving of $24,000 a year.

"No wonder we like Deltas."

Nothing here that a bit of ingenuity and common sense can't duplicate! —with cash benefits that can easily run big. Ask your Delta dealer for the latest Delta Catalog—listed in your Classified Directory under "Tools," —or write direct to Delta Power Tool Division, Rockwell Manufacturing Company, 638G Lexington Ave., Pittsburgh 8, Pa.

DELTA QUALITY POWER TOOLS

Another Product by **Rockwell**

World's Largest Builders of World's Largest Cranes

Alliance...

FIRST IN SIZE! FIRST IN CRANE DESIGN!

LOOK AT THE FEATURES OF THIS NEW CRANE!

- **Working parts easily accessible for quick maintenance.**
- **Adequate end bracing and large gusset plates keep crane square and girders plumb.**
- **Liberal safety factors . . . girders, ropes, bearings, gearing, motor sizes.**
- **Sealed lubrication on all roller bearings.**
- **Enclosed controls keep out mill dirt and, as located on foot walk, provide maximum accessibility.**
- **Operation easily and accurately controlled. Operator's cab located at center of bridge gives best visibility.**
- **One-piece welded trolley frame.**
- **All-steel construction including cast steel drums.**

For over half a century leading mill designers and builders for heavy industry have turned to The Alliance Machine Company for dependable heavy-duty cranes. Alliance has constantly pioneered mechanical features which are accepted today as conventional. Alliance can develop equipment best suited to your company's particular heavy material handling needs. Write for full information.

THE ALLIANCE MACHINE COMPANY

MAIN OFFICE • ALLIANCE, OHIO • PITTSBURGH OFFICE • OLIVER BUILDING, PITTSBURGH, PENNSYLVANIA

Alliance Standard Steel Mill Crane in the Cold Strip Reduction Department of the Fairless Works, U. S. Steel Corporation. This standard overhead crane has a 100-ft. span, with a 90-ton main hoist and 30-ton auxiliary hoist.

NEW PRODUCTS and equipment

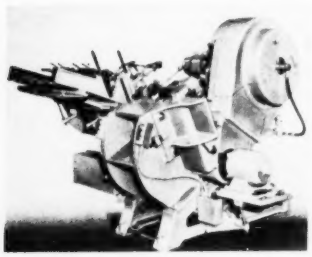
Reply card on page 131 will bring you more information on any new products and equipment in this issue

Strip Feed Press

. . . feeds castings continuously

Model 401 strip feed press for high production of light stampings is redesigned to increase speed with multiple dies. In addition, continuous feed stack provides at least a 1-hour production run before reloading. Rated capacity is 25 tons.

Machine has an improved frame design using a welded steel struc-



ture that maintains perfect alignment without tie bars. Fawick clutch and brake directly on the crankshaft assures smooth starting, protection to crankshaft and dies, and almost instant stopping. Baldwin - Lima - Hamilton Corp. Dept. ST, Hamilton, O.

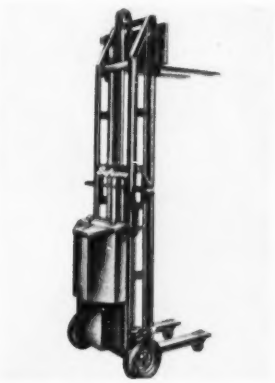
FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Maximum-Safety Truck

. . . rated weight: 1250 pounds

Designed for maximum safety with one-man operation, this lift truck is made for lifting heights of 68, 80 and 100 inches and has lift rating of 1250 pounds. Automotive-type battery is equipped with built-in charger and automatic cutoff and trickle charge.

Truck has electronic switch to cut off power at maximum height and prevent jarring load and damage to hydraulic system. Hand-operated brake not only prevents movement of truck when loading and unloading, but brakes the unit when traveling up and down in-



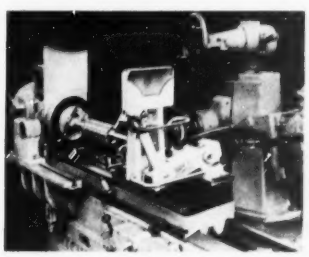
clines. Although a fork lift type, the truck can be equipped with a snap-on platform. Safeway Industrial Equipment Corp., Dept. ST, 184 N. Franklin St., Chicago 6, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Wheel Forming Attachment

. . . involute accuracy, fidelity

Accuracy and fidelity of involute shape is gained by application of this Diaform wheel forming attachment to spline grinding ma-



chines. Procedure form-trues grinding wheel contours accurately, insuring retruing of any given form to the same degree of accuracy as often as is necessary. Time-consuming cut and try methods are eliminated.

Attachment works on the pantograph principle, giving the user a 5 to 1 or 10 to 1 ratio between template followed and diamond that trues the grinding wheel. Pratt & Whitney, division of Niles-Bement-Pond Co., Dept. ST, W. Hartford 1, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Portable Strapping Kit

. . . weighs only 17 pounds

Weighing only about 17 pounds, this completely self-contained steel strapping kit can be carried easily from job to job in plants, shops

and storage yards. Called the Utilikit, it contains a 300-foot steel strapping coil in a cardboard dispenser, 1000 strapping seals and three basic tools: Stretcher, sealer and snips. Brainard Steel Division, Sharon Steel Corp., Griswold St., Warren, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Flame-Cutting Equipment

. . . scarfs curved metal edges

Edges of curved metal pieces are scarfed in preparation for welded assembly of larger units with this flame-cutting equipment. The method should permit designing increased strength into curved met-

Follansbee Cold Rolled Strip is custom-made strip steel that fulfills most manufacturing needs. Regardless of the stamping or forming operations involved, the quality of Follansbee Cold Rolled Strip offers these real advantages:

- **Close tolerances**
- **Mill finishes for quality products**
- **Supplied in coils for fast action in presses**

You get real productioneering efficiency and time-saving economy when you feed your presses directly from coils of Follansbee Cold Rolled Strip.

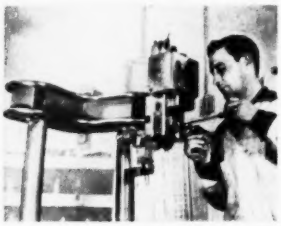
Follansbee Steel Corporation is set up to provide you with quick, direct, personalized service. Consult your trained Follansbee Steel representative. He will be glad to discuss your fabricating problems with you.

FOLLANSBEE STEEL CORPORATION
GENERAL OFFICES, PITTSBURGH 30, PA.

NEW PRODUCTS and equipment

al structures made up of welded parts which themselves are curved.

Manufacturer calls its equipment three-dimensional because it



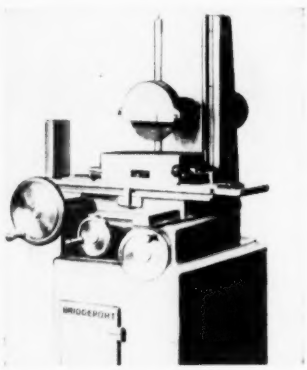
operates vertically, horizontally and at angles from the first two as it scarfs the curved metal edges. Drive rollers move at speeds up to 15 ipm, powered by a 1/25-hp motor. Milwaukee Shipbuilding Corp., Dept. ST, 3718 W. Lancaster Ave., Milwaukee 9, Wis.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Table-Size Surface Grinder

. . . sustained grinding accuracy

Thin table-size surface grinder is 13 inches under wheel, takes a standard 7 x ½ x 1¼-inch wheel. Machine has an antifriction ball



and rolled bearing motorized Pope, Ex-Cell-O or Whitnon spindle. It is built to permit sustained grinding accuracy.

Upright column that houses the

USE A REPLY CARD
Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

69. Steam Regulating Valves

Kaye & MacDonald, Inc.—12-page illustrated bulletin 535 contains technical data and specifications for D'Este automatic regulating valves for steam. Internal pilot, weight and lever, spring and external pilot controlled types are covered.

70. Core & Mold Ovens

Carl-Mayer Corp.—Variety of core and mold ovens, including rack, car, vertical, horizontal monorail, rolling drawer and portable types are outlined and illustrated in 16-page bulletin No. 53-CM. Also covered are ingot mold dryers and heat treating furnaces. Construction details are related.

71. Air Cylinders

Lindberg Engineering Co. — Diagrams, charts and photos explain the capacity, type of mounting and other data on line of air cylinders covered in 16-page catalog 731. Many dimensional diagrams are used.

72. Induction Heaters

Weltronic Induction Heating Corp. —Complete line of Weltronic induction heating equipment is subject of new illustrated booklet of 12 pages. Interchangeable fixtures are one of many features discussed. Also covered are applications, work tables offered and accessories.

73. Bricks, Sticks & Stones

Simonds Abrasive Co.—Aluminum oxide and silicon carbide dressing stones for variety of purposes are described in illustrated 8-page catalog "Bricks, Sticks and Stones." Ordering information with specifications is furnished for each item.

74. Automatic Threaders

National Acme Co. — Description and complete specifications on automatic threading tools are contained in 48-page catalog DT-52. Self-opening Vers-O-Tool heads using ground thread circular and adjustable blade chasers for external threading, cutters for end-forming and turning, and rolls for knurling and burnishing are covered along with Namco style RST collapsible taps which use circular and regular flat type chasers.

75. Stainless Steel

Sharon Steel Corp.—Analysis, properties, fabricating data and typical applications for Sharon 430 stainless steel are detailed in illustrated 12-page booklet. It contains about 17 per cent chromium with no nickel and is in the all-purpose classification.

76. Flexible Tubing

Flexible Tubing Corp.—In diameters from less than 1 to 30 in., a complete line of flexible tubing is described in 4-page illustrated catalog C2-3. Ventilation, dust collection and materials handling are among the applications for this product, which is made from fabric supported rubber or plastic wound on helical spring wire coils.

77. Press Coolant System

Independence Pattern & Machine Works, Wade & Sons, Div.—Adaptable to all well-known makes of drill presses, this coolant unit, consisting of fittings, coolant tank and pump and piping, can be fitted in a half-hour or less. Four-page illustrated catalog describes model 10-8.

78. Hydraulic Presses

Denison Engineering Co. — This issue of the "Denison Press" outlines manual safety controls and their components as applied to a Multipress. Also described are the new touch control which gives a "delicate touch" to press operation and manually controlled Multipresses for riveting, blanking and forming and drawing.

7-13-53

STEEL
Penton Building, Cleveland 13, Ohio

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COMPANY _____

PRODUCTS MANUFACTURED _____

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CITY AND STATE _____

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79. Ordering Valves

Cooper Alloy Foundry Co.—"How to Get What You Need When You Order a Valve" is title of an 8-page technical bulletin. Two articles point up the necessity for correct ordering procedure, and give general outlines such an order should follow and the data required when ordering specialized valve types.

80. Die Casting Machines

Cast-Master, Inc.—Die casting machines for production of small and medium to large and outsize castings are illustrated and their specifications given in 8-page catalog. Featured is optional hydraulic system which minimizes fire hazards.

81. Center Distance Gage

Sorensen Center-Mikes, Inc.—The Center-Mike, a tool for finding the distance between centers of holes, is subjective of 4-page descriptive bulletin 652. With tool, user can, in 30 seconds, produce a direct reading within 0.0005-in. of exact dimension without any figuring or intermediate reading and without knowing hole sizes.

82. Balancing Machines

Kurt Orban Co.—Highlights of 8-page brochure on Trebel dynamic and static balancing machines include description of balancing principle, setup of the machine, how it operates and illustrations of five models. Specifications are also presented.

83. Fabricated Alloys

Rolock Inc.—Baskets, racks, crates, tanks and sinks for degreasing, cleaning, dipping, galvanizing, pickling, quenching and other processing operations on metal parts is described and illustrated in 24-page catalog B-9 (corrosion resistant section).

84. Handling Bulk Materials

Frank G. Hough Co. — Over 40 pages of data are found in illustrated "Bulk Materials Handbook," a giude to improved methods for moving and handling loose, nonpackaged materials. Working tables and formulas for estimating specific job performance are included, along with info on analysis of your problems, many tables and even scratch paper.

85. Machining Facilities

Ottawa Steel Products Inc.—This company specializes in the contract production of such items as spline, pump and cam shafts, rotor liners and control valves. Four-page bulletin illustrates typical products, lists machines and facilities available. Heat-treating is included.

86. Carbide Tools & Blanks

DoAll Co.—12-page illustrated catalog 52-817 has data on single point carbide cutting tools, tips and blanks in both unground and preformed styles. Turning, threading and square nose lathe tools are included, with shank, tip size and carbide grade info. General information is provided concerning the proper use of carbides.

EDITORIAL ARTICLES
Available in Limited Quantities

87. Vacuum Metallurgy

In STEEL article "Vacuum Metallurgy Grows: Can You Use It?" Dr. Allen G. Gray points out that high vacuum metallurgical furnaces now offer a practical method for producing metals and alloys having properties not obtainable by conventional processing. Melting of titanium, zirconium and molybdenum is one of their capabilities.

88. Radial Forming

Originally developed as a means of forming wing tank sections at Ryan Aeronautical Co., success of 1200-ton machine is responsible for new 4800-ton model. It precision-forms big jet parts. For the complete story get STEEL article "Radial Forming Gets Added Muscle."

89. Fast Mill Reversal

"Fast Mill Reversal Licks Split-End Slab Problem" is title of STEEL article which describes twin drive 10,000-hp motor used to reverse blooming mill rolls at Jones & Laughlin Steel Corp. Reversal is from 40 rpm to 40 rpm in one second. Motor provides high production with minimum of electrical maintenance and downtime.

90. Twisting Carbide

Although carbide tool tips are most often thought of as rigid, several companies are twisting and bending carbide inserts to fit helical tool bodies. STEEL article "Carbide with a Twist" describes how it's done at Boeing Airplane Co.

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NEW PRODUCTS and equipment

spindle is heavily reinforced against strain. Spindle is designed to insure radial and axial rigity. Bridgeport Grinding Machine Co., division of American Machinery Co., Dept. ST, 315 Asylum St., Bridgeport, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Mobile Loading Ramp

. . . simplifies yard loading

All-magnesium mobile loading ramp is built primarily for use in simplifying yard car loading. The ramp makes possible full use of

power trucks in the loading operation. As a result, more expensive hand loading methods can be eliminated, while car-spotting and demurrage expenses are minimized.

The ramp will support 13,000-pound loads, but one man can move it about the area with ease. Magline Inc., Dept. ST, Pinconning, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Particle Distribution Analyzer

. . . for powder metal control

A rapid and accurate determination of particle size distribution of powdered metals is possible with this analyzer. Called the Micrograph, the precision instrument should be of interest to industries producing or handling such items as metal powders, abrasives and pigments.

Values are indicated not only as a research aid but in production and quality control, since import-

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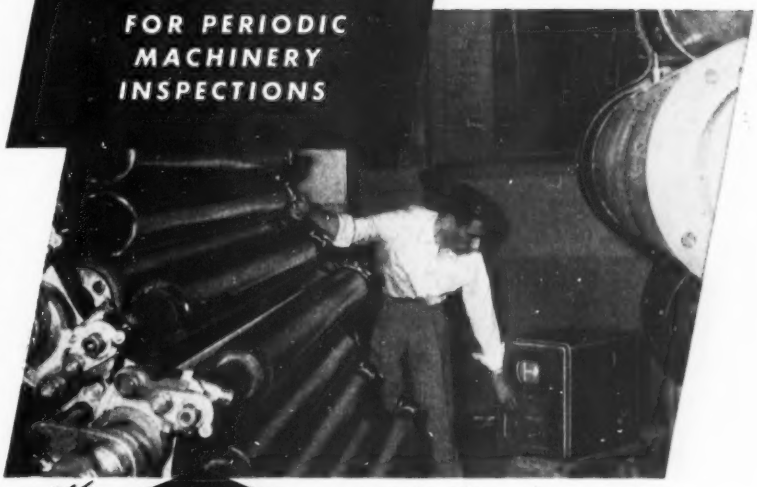

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ant characteristics of a powder are related closely to particle size distribution. Housed in a complete, integrated unit, the analyzer is

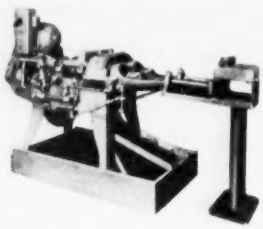
mounted on a wall or column and requires only 13 x 23 inches of floor space. Sharples Corp. Research Laboratories, Dept. ST, 424 W. Fourth St., Bridgeport, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Nut Blank Machine

. . . stock and drills both rotate

Both bar stock and drills rotate simultaneously in opposite directions to speed machining operations in this nut blank machine. Machine employs two tools to per-



form the cutoff operation. This results in a reported 10 per cent savings in stock on average-size pieces.

Chuck mechanism is actuated by centrifugal force of rotating weights rather than by cam action. Machine has twin spindles enabling two bars to be machined simultaneously. Mill Glass Engineering Co., Dept. ST, 148 S. Glenwood Ave., Columbus, O.

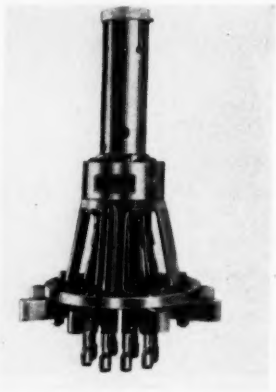
FOR MORE DATA—CIRCLE REPLY CARD NO. 9

Adjustable Tapping Head

. . . reverse built into head

Universal joint adjustable tapping head has reverse built into the head. Device is only about 1 inch longer than the manufacturer's universal joint drilling head.

This tapping head is designed to tap two, three or four holes in any pattern from 11/16-inch centers. Gears, spindles and shafts are one piece, hardened and ground. The unit has ball thrust bearings at all



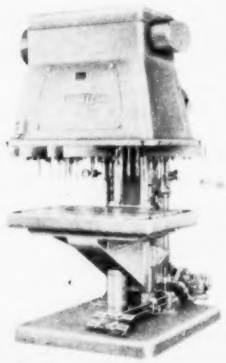
thrust points and employs oilite radial bearings. Errington Mechanical Laboratory Inc., Dept. ST, Staten Island 4, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Multiple Drilling Machine

. . . rectangular hood type

Hood-type multiple drilling machine is designed with universally adjustable spindles for drilling many different jobs on one machine. The hood has an 18 x 36-inch rectangular drilling area with



provision for adjusting the spindles to any point in the area. A 10-hp motor drives the spindles through a variable speed mechanism, allowing adjustment of the spindle revolutions-per-minute to suit various sized holes and materials.

Rapid table traverse allows rapid advance to point of drilling, normal drilling and rapid return. Foot treadles control feed stroke, allowing table to be started, stopped or reversed at any point of feed or return stroke. Feed rate is stepless. B. M. Root Co., Dept. ST, York, Pa.

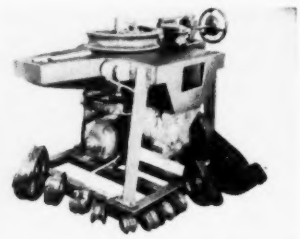
FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Pipe Bending Machine

. . . radii 5 times pipe size

Designed for power application to the manufacturer's type A-30 hand bender, this model 2PBR is built to bend ½ to 2-inch U. S. standard pipe. It works at radii about five times the pipe size, up to 180 degrees. Maximum radius of bend is 13 inches.

The model will handle bends up to 1½-inch extra heavy and 1½-inch double extra heavy; however, it is not built to be used for heavier bends. Its capacity covers a



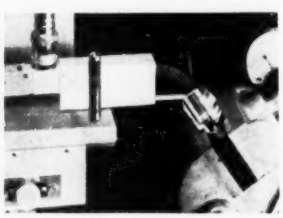
wide range in general use for maintenance, indirect heating and conduit bends. American Pipe Bending Machine Co., Dept. ST, Poultney, Vt.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

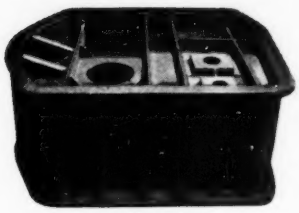
Profilometer Tracer

. . . measures internal tapers

Surface roughness on internal tapers, across internal shoulders and on other surfaces that can be reached only with a dogleg beam

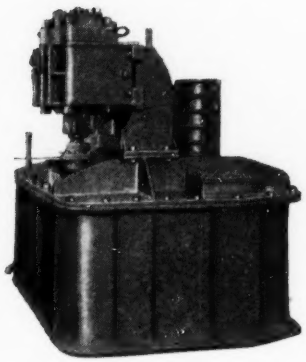


can be measured by this Profilometer type KC tracer. The tracer can also be used on any other internal or external surface where geometry of the work permits and



Welded Gear Case

Welded Turbine Housing



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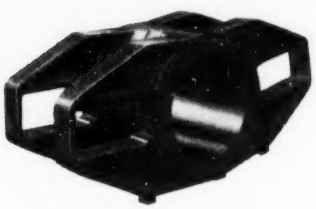
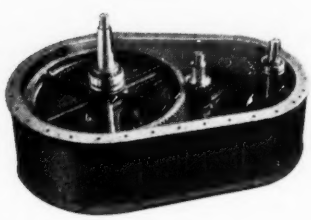


Welded Tiller



Welded Gear Housing

You can profitably employ our modern facilities

STRUTHERS WELLS Weldments

The products shown illustrate Struthers Wells' ability to fabricate weldment units from plate and bars. Forgings, tubing, rolled bars and beams are utilized as experience dictates.

The engineering and production "know how" of Struthers Wells, plus the facilities of three large shops, serve to your advantage. Consult us, and let us show you how we can reduce your over-all costs and maintain your production schedules with trouble-free Weldments by Struthers Wells.

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where part can be mounted on a Linear Pilotor with work surface horizontal.

Tracer has no skids; point is at the end of a long dogleg beam. Micrometrical Mfg. Co., Dept. ST, 345 S. Main St., Ann Arbor, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Bracket-Mounting Cord Reel

. . . no kinking or tangling

One solution to kinking and tangling of long electrical cords is indicated in this bracket-mounting portable reel. Mounting bracket permits attachment to the frame,

chassis or handle of portable power equipment. It has a built-in dust-tight collector ring that permits continuous flow of electrical current as the reel is turned.

A free-turning knob provides easy winding and the reel is equipped with an adjustable brake and lock. Industrial Electrical Works, Dept. ST, Room B 306, 1503 Chicago St., Omaha 2, Nebr.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Hydraulic Knife Grinders

. . . take any straight cutter

Any straight-edge cutter can be sharpened by this Hydro-Travl type NN knife grinder, whether

knives and blades are made of high speed steel, carbon steel, carbide or tipped high speed. Design features include inverted V ways which are self-adjusting to take up wear; three-speed precision spindle V-belt drive or direct motor drive.

Machine is operated by double-plunger hydraulic drive having almost no mechanical wear parts. In operation, a cutoff device can be set to do the desired amount of grinding on the knives, then machine turns itself off. Dependable Machine Co., Dept. ST, Greensboro, N. C.

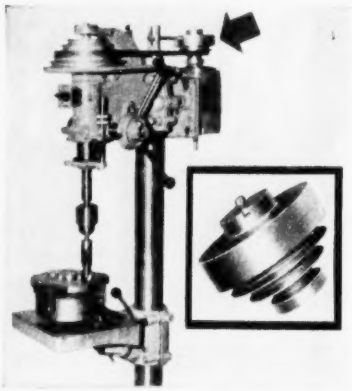
FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Speed-Reducing Pulley Line

. . . for light drill presses

Three models of the manufacturer's speed-reducing pulley make it possible to drill efficiently up to 1¾-inch steel on light drill presses with a ½-hp motor. Each unit is adaptable to three motor shaft sizes: ½, ⅝, and ¾-inch.

As a result, units can be transferred to various machines with



different motor shaft sizes. Previous models were adaptable to one shaft size only. Pull-Gear Co., Dept. ST, 4118 E. Eight Mile Rd., Detroit 34, Mich.

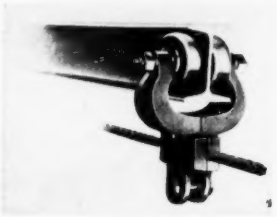
FOR MORE DATA—CIRCLE REPLY CARD NO. 16

Heavy-Load Cable Conveyor

. . . employs ⅜-inch cable

Overhead trolley conveyor has ⅜-inch cable to produce increased capacity. Trolleys are rated at 100 and 200 pounds capacity for standard and heavy-duty wheels, operating on 3-inch I-beam track. Conveyor has ⅜-inch diameter preformed special aircraft cable, also available in stainless steel. Standard trolley spacing is 16 inches on immovable centers.

Factory or field applied, the conveyor locks to the cable with strength equal to ultimate cable strength. There is no possibility of



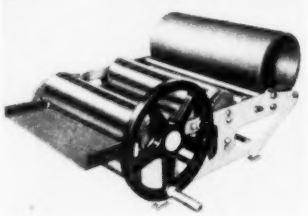
movement. Trolley spacing is permanently accurate. E. W. Buschman Co., Dept. ST, 4401 Clifton Ave., Cincinnati 32, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 17

Portable Pan Forming Machine

. . . turns 50 feet in 1 minute

Portable hand-operated pan forming machine will turn up edges of a 50-foot roll of terne in



1 minute. The operator needs only insert the continuous roll of metal at one end of the machine and thread it through a set of rollers. Speed with which pans are formed is simply a matter of how fast the operator wants to pull them through. Follansbee Steel Corp., Dept. ST, 140 Stanwix St., Pittsburgh 22, Pa.

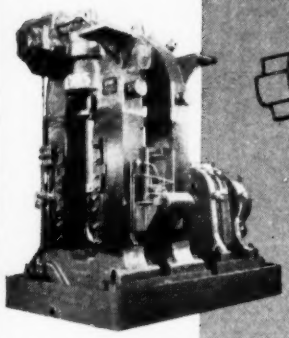
FOR MORE DATA—CIRCLE REPLY CARD NO. 18

Volume Plating Method

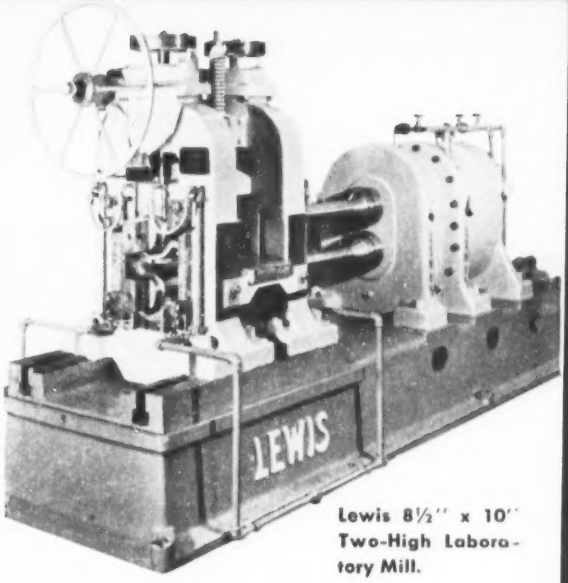
. . . retains close tolerances

Close tolerances are reported possible through the Cantavone method for volume electroplating intricate precision components with precious and common metals. Techniques are designed to plate components with required number and type of electrodeposits in high volume and at cost that compares favorably with conventional methods.

According to the company, these techniques have proved practical in

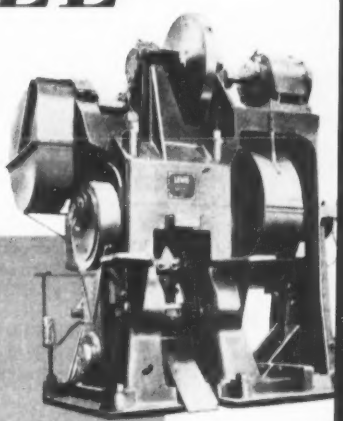


10" and 24" x 20" Four-High Reversing Mill Stands.



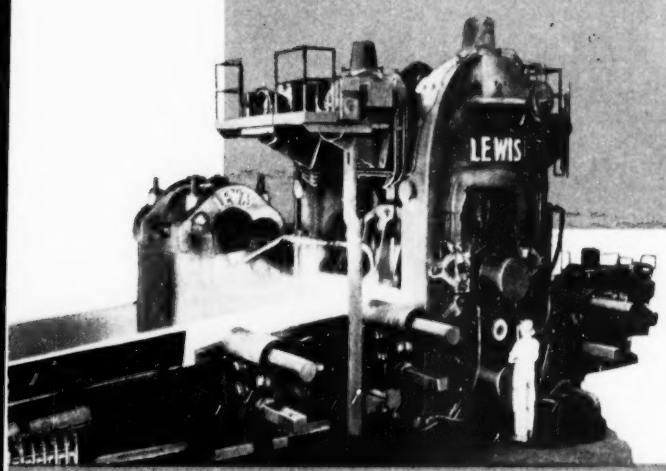
Lewis 8½" x 10" Two-High Laboratory Mill.

LEWIS ROLLING MILL EQUIPMENT



Exit side of Lewis 8" x 8" Up-Cut Shear.

Lewis equipment will meet *all* your requirements whether you are modernizing your plant or increasing your rolling mill facilities. You can call on Lewis for a small laboratory mill, shear or a large plate mill—or anything in between. Lewis' ability to design and build efficient, cost-reducing machinery for rolling steel and non-ferrous metals is known throughout the industry.



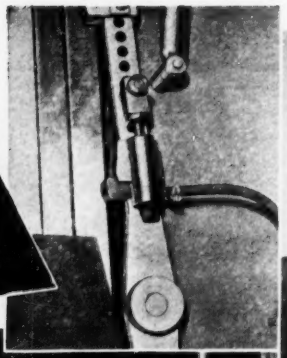
26½" and 42" x 112" Three-High Balanced Finishing Plate Mill.

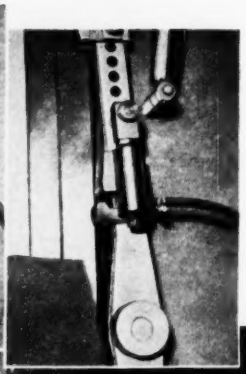
BLAW-KNOX

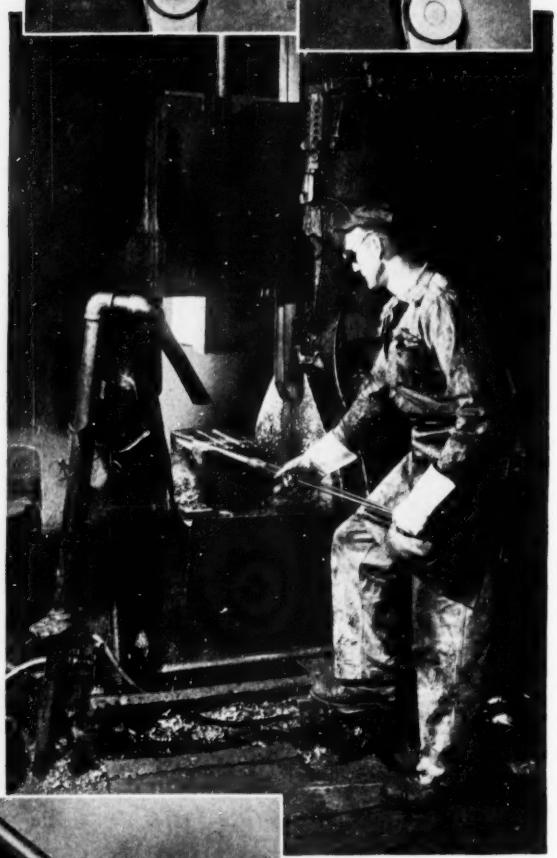
BLAW-KNOX COMPANY
LEWIS MACHINERY DIVISION
PITTSBURGH 22
PENNSYLVANIA

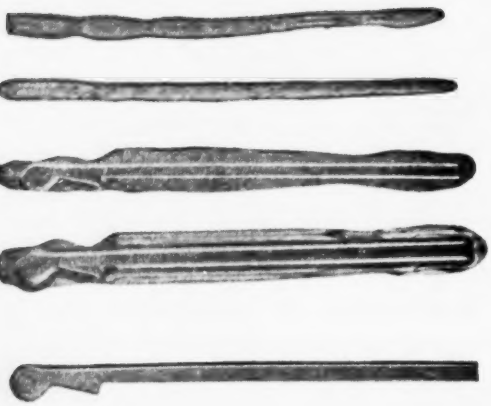
CECO-DROP SHORT STROKE CONTROL

"Makes the Hammer Talk!"





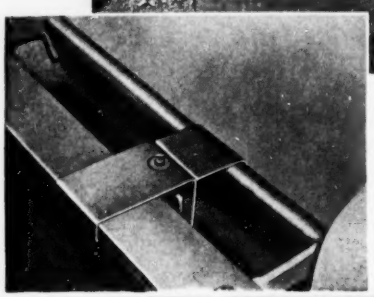




An installation of a Short Stroke Control on a 2500 lb. CHAMBERSBURG CECO-DROP HAMMER is shown, forging steel ankle joints for leg braces. Above are samples of the forging as it appears during various stages. The forging process begins with a series of 20 to 23 short, rapid blows (about 18" stroke) to draw the 2½" dia. stock. This is followed by two long blows (about 35" stroke) to roll it, three more long blows in the rough impression, and three more long blows to complete the forging. After the last blow the ram is stopped on the up-stroke at the "short blow" position for the next forging.

Short Stroke Control is but one of the many features of Chambersburg CECO-DROPS. These piston lift, gravity drop hammers are setting new standards in forge shop production. Lower operating costs, minimum down time, easy operation, wide range of operations, extra safety; all add up to "more forging per hour" the basis on which to judge the efficiency of a Drop Hammer. Write for Bulletin 11-L-0.

CHAMBERSBURG ENGINEERING COMPANY
CHAMBERSBURG, PA.



(Above right) Dog in full stroke Position. Wedge is lifted, Short Stroke Control is inoperative.

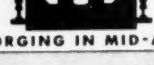
(Above left) Dog in Short Stroke Position. Wedge is down, holding dog in operating position.

(Lower left) Button on treadle when depressed by operator shortens the stroke. Release reverts to full stroke.

CHAMBERSBURG

THE HAMMER BUILDERS

Builders of **THE IMPACTER**



"FORGING IN MID-AIR"

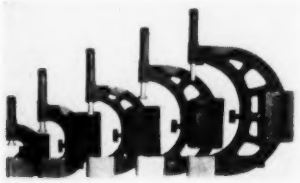
volume plating intricate components with as many as five electrodeposits controlled to plus or minus 0.00001 to 0.000001-inch. American Electro Products Inc., Dept. ST, 1358 Thomaston Ave., Waterbury, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO. 19

Adjustable Air Snap Gage

. . . a contact-type unit

Operation of this air snap gage is done by a contact principle. Thus, workpieces are positioned directly on the flat tungsten carbide gage anvils and the user can feel when the workpiece is in the gaging head correctly. Air jet



does not contact the workpiece; instead, is located in the sensitive anvil assembly.

Frictionless movement in this anvil is read on the dial of the manufacturer's Dimensionair instrument, which gives direct readings to the nearest 0.00005-inch. Wide adjustment makes it possible to cover a capacity from 0 to 6 inches with 5 sizes. Federal Products Corp., Dept. ST, 1144 Eddy St., Providence 1, R. I.

FOR MORE DATA—CIRCLE REPLY CARD NO. 20

Small-Capacity Lift

. . . 36-inch loads; 6-foot aisles

Maximum maneuverability, operator convenience and simple maintenance are characteristics of this 1500-pound capacity fork lift truck. Called the FL-15, the truck is capable of stacking 36-inch loads in a 6-foot aisle.

All major maintenance elements are located in a cowl directly under the driver's seat. Cover is bolted to the frame and can be removed in minutes for any necessary repairs.

Absence of usual cowling in front of the operator gives him perfect all-around vision at floor level. Offset seat position provides an unobstructed view of both load and plant fixtures. Industrial Truck

Division, Baker-Raulang Co., Dept. ST, 1230 W. 80th St., Cleveland 2, O.

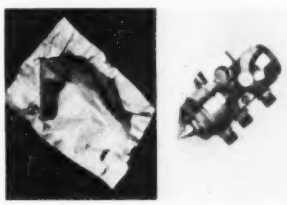
FOR MORE DATA—CIRCLE REPLY CARD NO. 21

Metal Protective Wrap

. . . sticks only to itself

Protective metal parts wrap is a coated product that sticks only to itself. Package is sealed when the wrap is placed over parts and pressed together. Spot-Seal makes a tight, dustproof, water-repellent jacket that keeps out dirt and foreign matter, protecting finely-finished metal surfaces from scratches, abrasion and fingerprints.

Wrapped parts are easy to iden-



tify, can carry code number marked on the package. Sherman Paper Products Corp., Dept. ST, 1640 Oak St., Newton Upper Falls 64, Mass.

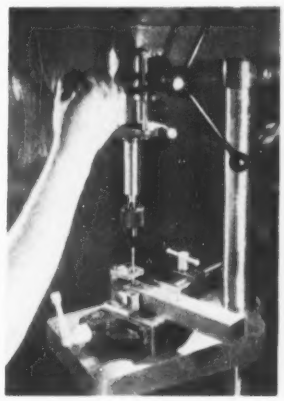
FOR MORE DATA—CIRCLE REPLY CARD NO. 22

Instant-Change Safety Vise

. . . turns over on three sides

Fast setup on production pieces is possible with this instant-change safety vise. Built with three bosses for easy jig attachment, the model is heavier than the manufacturer's previous type. Any number of holes can be drilled without removing the work, because the vise turns over on three sides.

Vice locks securely by a quarter-turn of the T handle at any position on the table. When not in



use, unit can be swung completely out of the way. American Machine & Foundry Co., Dept. ST, 511 Fifth Ave., New York 17, N. Y.

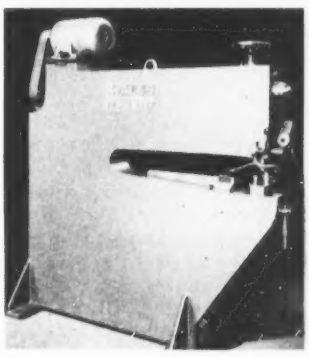
FOR MORE DATA—CIRCLE REPLY CARD NO. 23

Straight or Contour Shear

. . . no starting holes required

This shear is designed for contour and straight inside and outside shearing, beading, louvering and joggling. Its capacity reaches 9/32-inch mild steel. Material feeding can be started while ram is operating, and can be done without resistance to feeding and turning the work. Inside cutting requires no starting holes, eliminating preliminary operations.

Unit cuts from 10 to 36 fpm, depending on gage and material.



Throat depth is 36½ inches. An adjustable bottom shearing die can be set quickly for various material thicknesses. Wales-Strippit Corp., Dept. ST, 345 Payne Ave., N. Tonawanda, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 24

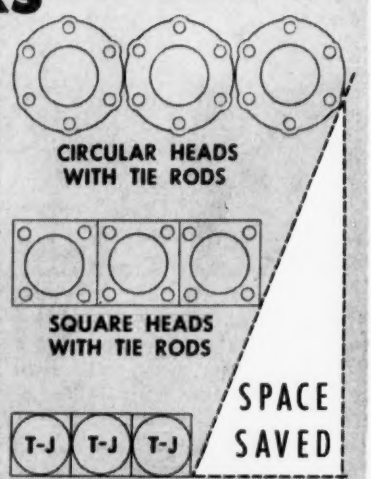
LESS SPACE!

extra high safety factor!

NEW T-J Spacemaker AIR CYLINDERS

These new T-J Cylinders *save up to 40% in mounting space*—with streamlined design that eliminates tie rods. They're *super rugged*—extra high safety factor . . . solid steel heads . . . heavy wall, precision honed, hard chrome plated, seamless steel body . . . leakproof cylinder head to body construction . . . heavy duty, hi-tensile, hard chrome plated piston rod.

Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . for pushing, pulling, lifting, clamping or control jobs. T-J dependability. Write for bulletin 8152. The Tomkins-Johnson Co., Jackson, Mich.



T-J SPACEMAKER . . . provides additional room for adjacent equipment without sacrificing strength.

37 YEARS EXPERIENCE

T-J TOMKINS-JOHNSON

RIVITORS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLINCHORS

New Plant, New Process

Republic's new Toledo plant will produce iron powder from a direct reduction process

NEW patented process for the production of powdered iron was perfected by Republic Steel Corp. (STEEL, July 6, p. 68). Republic will utilize the process for the commercial production of iron powder in a new plant, to be located in Toledo, O.

Plant will have a capacity of 50,000 pounds per day, a substantial part of the nation's present market for iron powder. It has been designed for expansion to keep pace with the expected growth in the market. Republic is the first of the nation's major steel companies to set up for iron powder production on a commercial scale.

MORE IRON POWDER PRODUCTION
. . . 50,000 pounds per day

Plant will be built on land recently acquired near the Toledo refinery of Sun Oil Co. where facilities are being erected by Sun for producing high octane gasoline, to be completed in October. Hydrogen, necessary for the Republic process, will be a by-product of the process to be utilized by Sun. Republic will purchase such of this hydrogen as it requires.

Direct Reduction—The Republic process utilizes iron ore both from the company's Adirondack mining operations and also ore mined in Liberia, West Africa, by the Liberia Mining Co., in which Republic has a majority stock ownership.

The technique resulted from

Vaughn®

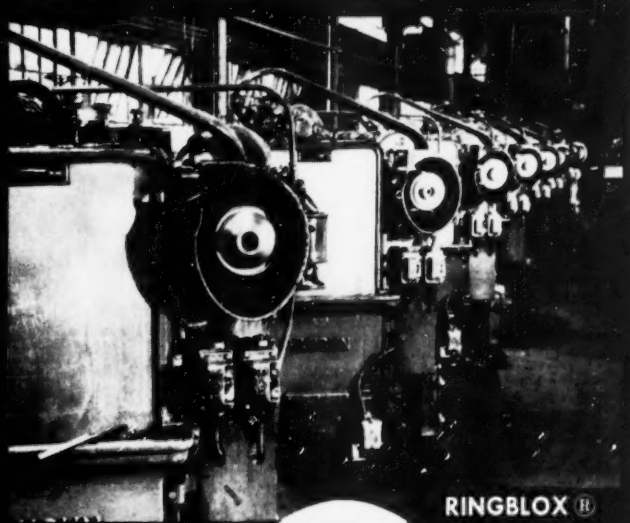
COLD DRAWING EQUIPMENT

-RIGHT

in types, sizes and capacities to profitably handle your jobs!

MOTOBLOC®

MOTOBLOX®



RINGBLOX®

DRAWBENCHES

"Quick on the Draw"

The Vaughn Machinery Co.

CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

this man has ice water in his veins!

Of course he'd never volunteer to give blood, anyway. But any resemblance of this old duffer to the average, red-blooded American is a mistake.

For instance, several million healthy Americans have given blood. *But it's not enough.*

So this is to tell several million more Americans that their blood is needed—now!

We've never let anyone down who was in trouble. When a GI gets wounded and suffers *shock*—he's in bad trouble. He's got to have blood and lots of it! Folks here at home need blood too—to save their lives.

So make a date with your Red Cross, Armed Forces or Community Blood Donor Center. *One* hour and you're on your way.

BUSINESS EXECUTIVES CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLANT BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOODMOBILE MAKE REGULAR VISITS?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . the need for blood is **urgent!**

GIVE BLOOD

...give it again and again

NATIONAL BLOOD PROGRAM

knowledge gained in a continuing study of the direct reduction of iron ore to high purity iron.

"Direct reduction" is the term generally applied to processes by which iron or steel may be produced directly from iron ore. Conventional steelmaking utilizes a dual process—first, the smelting of the ore to a form of iron in a blast furnace, and second, converting this iron to steel. No direct reduction process economically practical for steelmaking in the United States has ever been developed. The tremendous initial cost of conventional blast furnace and steelmaking facilities has provided an incentive for continued research into direct ore reduction methods.

Started Early — Investigations into direct reduction processes were started shortly after acquiring its iron mining properties in the Adirondack region of New York State in May, 1938. Although Adirondack ore is low in iron content, it can be beneficiated readily into a very fine quality ore with a high iron content and a low percentage of deleterious elements, ideal for direct reduction. In this beneficiated form, it has been used by Republic for fifteen years as raw material for blast furnaces in the conventional iron making process.

In 1948, and for several years thereafter, Republic joined forces with the Henry L. Crowley Co., Inc., of W. Orange, N. J., in an intensified research program on the problem of producing iron from ore by direct reduction methods. The problem was approached by a radically different method than any previously attempted. After several years of study in the laboratory, a pilot plant was constructed to prove out the process. Ultimately, it became possible to produce substantial amounts of a very pure iron powder day after day from either low grade or high grade ores.

Water-Oil Soluble Bulletin

Illustrated 4-page bulletin describing applications and methods for use of the new dynatomics water-and-oil soluble metal cutting fluid, Metalloid WOS, is available from the Metalloid Corp., Huntington, Ind.

Rolling with the Punches..

Drum segment assembly, 17½" dia. x 46" long—rough, sandy steel forging. Note the many interrupting cavities on the surface that give the tool its bumps.

On the jump cut job illustrated, a Kennametal clamped-tool is a 6 to 1 favorite over a HSS tool . . . takes thousands of bruising blows on its nose without breaking down; cuts miles of forged, sandy steel without wearing out.

Here are the comparative performances:

HSS tools took 12 hours to complete 2 cuts, and were reground 4 to 8 times. Kennametal tool Style BRH32, Grade K2S, operating at 6 times the speed, does the same work in 2 hours. Its clamped-on tip requires only 2 regrinds.

Great strength and ruggedness are required in a cutting tool, to enable a lathe to keep rolling on interrupted cutting. These qualities, inherent in Kennametal tools, are equally valuable for light, continuous cutting jobs. Ask our Field Engineers to demonstrate. Kennametal Inc., Latrobe, Pa.

KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

Spin-Caster for Shells

Watertown arsenal working on machine to end 90-mm reject problems. Success seen

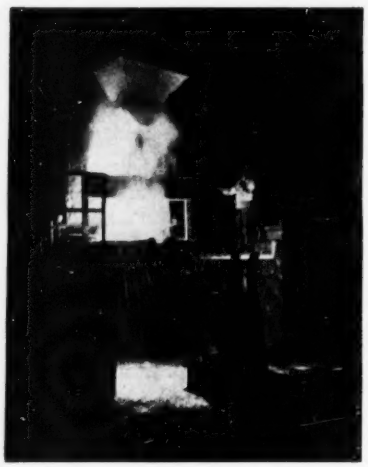
CENTRIFUGAL-casting machines at Watertown Arsenal, Watertown, Mass., were the mainstay of gun tube production during the early days of World War II. But centrifugal casting, a process developed principally by Army Ordnance, still needed improvement.

Though the machines had as high a yield as forging processes, the yield was not enough to satisfy the arsenal. For 105-mm howitzer tubes, casting in the centrifugal-casting machines was 90 per cent successful. For 40-mm guns, casting was 95 per cent sure. But in the long, thin tubes, such as the 90-mm. guns, yield was 60 per cent.

Solution Coming — Now, under pressure from semi-mobilization, Watertown has funds on the way to build an improved centrifugal caster that will turn out 90-mm tubes with less than 10 per cent rejects. And it is expected that the new machine will reduce manhours of work per tube manufactured.

Machines used today at Watertown have cast-iron molds into which hot steel is poured from an induction furnace. The mold, shaped to the size of a particular gun tube, whirls at high speeds, throwing the metal centrifugally from the center to the inside surface of the mold. The cast iron absorbs the heat from the metal. Air surrounding the mold, in turn, cools the iron.

Water-Cooled — New machines, already in the design stages, will have a steel rather than cast-iron mold and will be water-cooled. The machines will include the best features of Watertown's present centrifugal casters, plus improvements



SPINNING TROUBLES FADE
. . . refinements on the way

incorporated in casters of other countries, such as England, France, Czechoslovakia, and Germany.

Germany today uses water-cooled centrifugal casters. Ordnance experts, following the Allies into France, Germany, and Austria during World War II, made careful inspections of gun-tube factories and brought back to Watertown useful production data.

Watertown, like all other Ordnance installations, does not aim at mass production. The arsenal's assignment is to continuously develop a reservoir of production techniques which, in the event of war, can be turned over to civilian manufacturers. In addition to research, the arsenal fills the gap in tube production until civilian contractors can get into full swing.

Hartford Special Automatic Thread Rollers feature completely automatic hopper feed, vibration free operation and quick and easy setups. Model A-312-H above rolls screws from No. 6 (.138) thru 5/16" diameter with thread lengths up to 2½". Smaller model A-190-H rolls screws from No. 2 (.086) thru No. 10 (.190) with thread lengths up to 1½".

For complete information send for Bulletin TR.

When it comes to production —

HARTFORD Special

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

Tolerances Get Fast Check

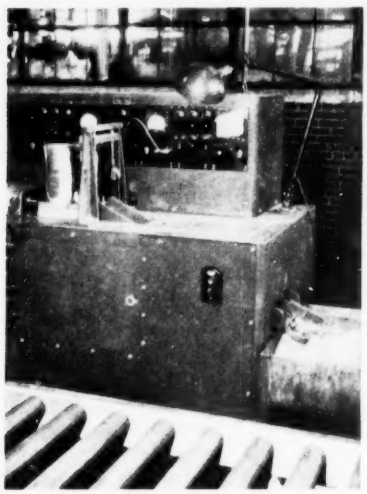
Cam rings are indexed eight times about vertical axis, then classified automatically

CAM RING is the name given to the external member of the overrunning clutch used in Chrysler and Plymouth torque converters. Fast automatic gaging of these rings is done in Chrysler Corp.'s plant by two Arlin Segregators. These machines include a magazine in which the finish machined rings are stacked.

Rings are pushed one at a time from the bottom of the stack by a ram that transfers the rings to gaging position. While in this position, each ring is indexed eight times about its vertical axis.

Surface Check—At each position, gages automatically check the diameter of the cam surfaces at a specific point within 0.0007 inch and also check parallelism of the cam elements. Thereafter, the ram advances another ring from the magazine and it pushes the prior one into a chute leading to tote boxes.

In the chute a gate is arranged so if the part just gaged has all



GAGING EIGHT DIMENSIONS
. . . after loading, entirely automatic

dimensions checked within specified limits, the part slides into an accepted box. If any dimension checked is outside these limits, the gate shifts, the part is diverted into a reject box and sent to a salvage setup. There, if the fault can be corrected, this is done and an air gage is used to recheck the ring. Parts having inside diameters greater than the top limited are scrapped.

Completely Automatic — Operation of the machines is completely automatic save for loading the magazines and for arranging parts ejected into tote boxes. Thus, the rings are in uniform layers with corrugated boards between. Each machine can gage 150 rings an hour, good speed considering the number of points gaged on each ring.

Filters Paint in Water

Delpark Corp. and Industrial Filtration Co., Lebanon, Ind., have perfected a filtration system for the removal of paint sludge and particles from paint spray booth water.

Automatic skimming systems move flocculated paint to a weir over which the paint matte is delivered to the filter. Labor is saved, spray booth efficiency is increased and salvage is made easier.

for ECONOMY—and EFFICIENCY

GRIPCO

LOCK NUTS

SAVE... on FIRST cost

Simplified design makes possible much lower price

SAVE... on APPLICATION cost

Fast Application cuts production time—and cost

DUPLICATE THE SAVINGS OF THESE GRIPCO USERS

One reason for Gripco Lock Nut Economy is that the locking action is inherent in the nut itself, and is produced by vertical thread deflection. No inserts, outside devices or extra height are required. Because of this simplicity, we can sell an efficient lock nut at a much lower price.

Because Gripco Lock Nuts are made to standard semi-finished full and jam dimensions, and eliminate the need for a lock washer, shorter bolts can be used. Write for samples and descriptive bulletin.

Another reason for Economy is speed in applying. Gripco Lock Nuts are started on the bolt like a common nut; then locked with a wrench.

**"Clinch" or Weld Nuts available with or without Gripco locking feature.*

NEW GRIPCO "CLINCH" NUTS*

Hex-shaped pilot fits into hexagon hole in metal. Pilot is then flattened out clinching nut.

GRIPCO HI-NUTS

Eliminate leaf spring breakage due to broken or lost lock washers.

GRIPCO PILOT-PROJECTION WELD NUTS*

Circular pilot positions nut in bolt hole, for instant resistance welding.

GRIPCO COUNTERSINK WELD NUTS*

Gripco countersink feature allows cooling and solidifying of weld spatter before it contacts threads.

Write for Samples, mentioning Types and Sizes of nuts you use.

3315

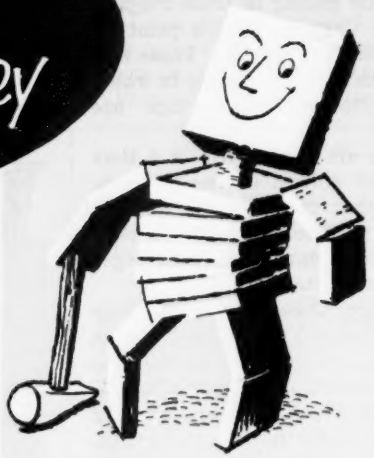
GRIP NUT COMPANY

308-N S. Michigan Ave., Chicago 4, Ill.

Two handy helpers that save time and money

HARBISON-WALKER Plastic Fire Brick and Castable Refractories

These versatile refractory products can be used for a multitude of important jobs around your furnaces and boilers—from the construction of a complete monolithic lining, to patching a roof, wall or hearth. Harbison-Walker Plastic and Castable Refractories are made in all the various classes, are easy to prepare and apply, and are readily available from nearby stocks.



H-W PLASTIC FIREBRICK
is made in standard and super classes. Slabs two inches thick are packed in cartons ready to apply by ramming.

H-W CASTABLE REFRACTORIES
may be used like concrete or applied by gun placement methods. They are made in eight classes, for every kind of service. Shipped dry, ready for mixing with water.

Send for information

BULLETIN EB-11

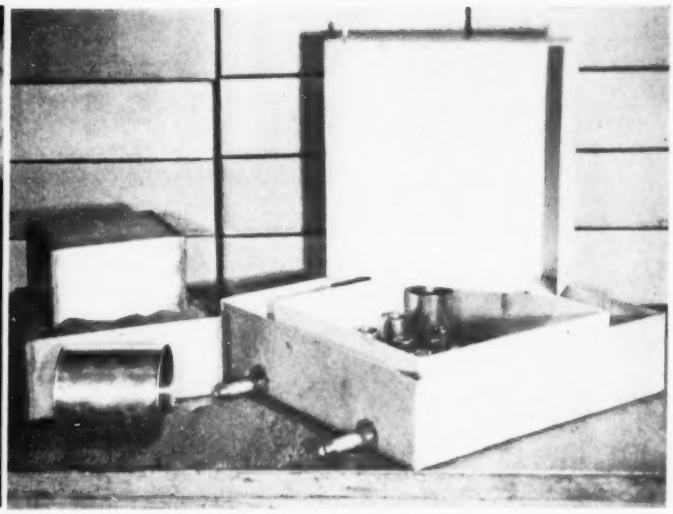
Complete data on all grades of Harbison-Walker Plastic Fire Brick and Castable Refractories are given in Bulletin EB-11.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES

World's Largest Producer of Refractories

General Offices: **PITTSBURGH 22, PENNA.**

Device is used to control the amount of copper paste applied by dipping procedures. Paste table turns at 3 rpm. Knife levels paste as it passes under blade



Retort on left has been sealed with sand and is ready for purging operation. Open retort on right shows the inner box containing parts and gas inlet and outlet

Two New Tools Brighten Copper Brazing

Iron-Containing copper brazing paste joins loose fits with clearances up to 0.005-inch. Retort achieves atmosphere work in conventional furnaces

By L. G. KLINKER
Glidden Co.
Cleveland

TWO RECENT developments of the Glidden Co., Cleveland, promise to open up new vistas in copper brazing.

Cubond, a copper brazing paste containing iron, makes it possible to braze such items as machine parts and stampings with clearances up to 0.005 of an inch. Maximum clearances of 0.015 of an inch have been handled by filling joints with iron powder or paste as an undercoat for the copper brazing paste.

The second innovation is a retort procedure that achieves atmosphere copper brazing in any furnace capable of developing 2030° F. Although the process isn't continuous, it eliminates the need for generating equipment or water-jacketed cooling under atmosphere.

Slow Paste—Iron added to the copper brazing paste is the key to its success. The metal slows the speed of the fluid copper, and the resulting "sluggish" brazing media bridges rough fits with little loss of bond strength.

Ease with which the paste is applied saves man hours, and when fits are relatively tight, other advantages include: Improved filleting, aid in keeping copper from flowing to other areas and reduction in "blinding" of screen assemblies.

Simple Box—The Glidden retort is essentially a box-within-a-box device. Parts to be processed are placed within the inner box; the lid, which clears the inner box by a considerable margin, is applied and sealed with special heat-resistant sand, which makes the retort reasonably gas tight.

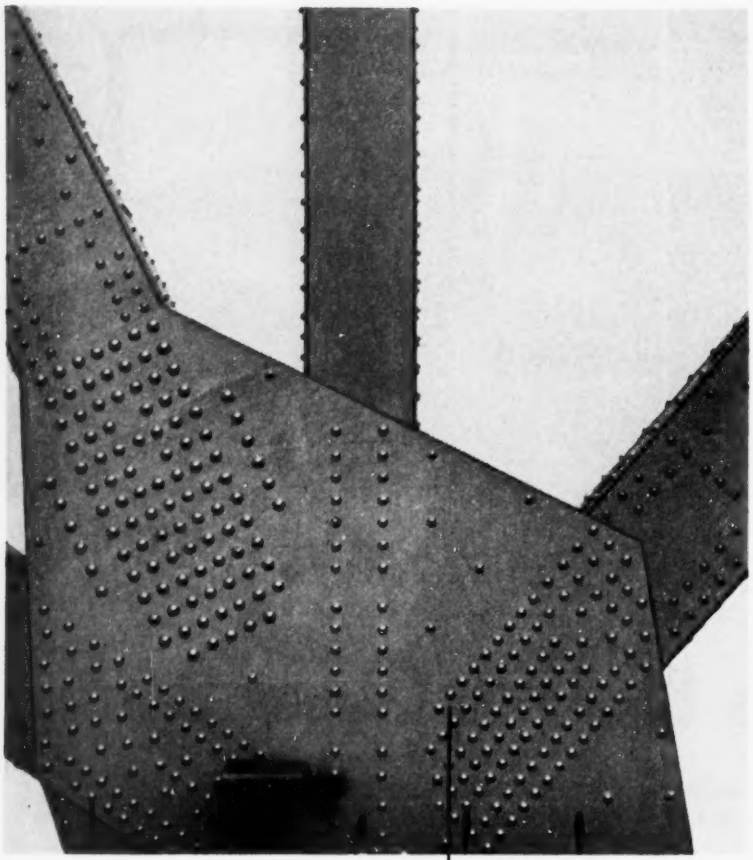
Purging is the next step. Small volumes of gas (93 per cent nitrogen, 7 per cent hydrogen) are piped into the retort from cylinders, liquid atmosphere producing agents, or generating equipment. A slight positive pressure is built up, and after a couple of minutes, the entire assembly is placed into the furnace which is at heat.

Brazing proper takes 15 minutes or more, depending upon the operation. After the retort is removed from the furnace, it is allowed to cool to slightly above room temperature with the gas inside under slight positive pressure. Bright parts are then removed.

Safety Factor—The gases, which are suitable for carbon steel retort brazing, are readily obtained from suppliers either in cylinders or with proportioning devices to make the desired mixes. An important feature of the mix is that it is non-explosive.

Straight nitrogen may be used if a solid or liquid reducing atmosphere producing agent is put in with parts being brazed. Such agents, on heating, provide high-hydrogen and carbon-monoxide atmospheres initially to clean the work. Then nitrogen from the cylinder takes over to eliminate the possibility of re-oxidation.

The retort method is restricted to batch jobs. However, it is convenient for the firm with only a few thousand pieces to process or the organization wishing to familiarize itself with the process before branching out to furnaces for atmosphere copper brazing.



Building with STEEL

Whether you're building a bridge, skyscraper, institution or industrial plant, you can't match the easier handling and faster construction time of Structural Steel.

The unexcelled facilities of Fort Pitt Bridge, combined with 56 years specialized engineering, fabricating and erection experience, are always available to you for any type of steel construction, any time, anywhere.

insures

- FASTER ERECTION
- LOWER COSTS and
- A BETTER JOB

Steel Permits Streamlining Construction with Safety, Endurance and Economy

Fort Pitt BRIDGE WORKS

Member American Institute of Steel Construction

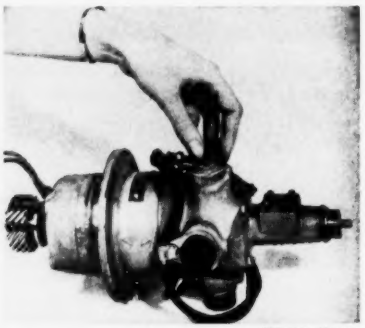
General Offices, PITTSBURGH, PA. • Plant at CANONSBURG, PA.

District Offices: NEW YORK, N. Y. • CLEVELAND, OHIO • DETROIT, MICHIGAN

Tiny, But Mighty Motor

AN EXPENDABLE electric motor that packs 25 hp into its 10 pounds helps the Navy's submarine crews guide their deadly torpedoes on a true course. The useful working life of the motor is but a fraction of a second—then it is blasted apart.

Development of the small but powerful motor, little larger than a rolled-up newspaper, was annouced in E. Springfield, Mass., recently by Westinghouse Electric Corp. Volume production in undisclosed numbers is under way for the Navy at the local plant of the firm's electric appliance division.



United Press

RUGGED PERFORMER
. . . with extremely short life

Starter Motor—While engineering details of the motor are restricted for security reasons, it was revealed that its sole 'life work' is to serve as a starter for the torpedo's gyroscope—the guiding mechanism which keeps a torpedo on its predetermined course. A small prong at one end of the motor shaft meshes with the gyro's flywheel as the torpedo is shot from its tube. In about one-fifth of a second, the flywheel is spinning at upwards of 13,000 rpm.

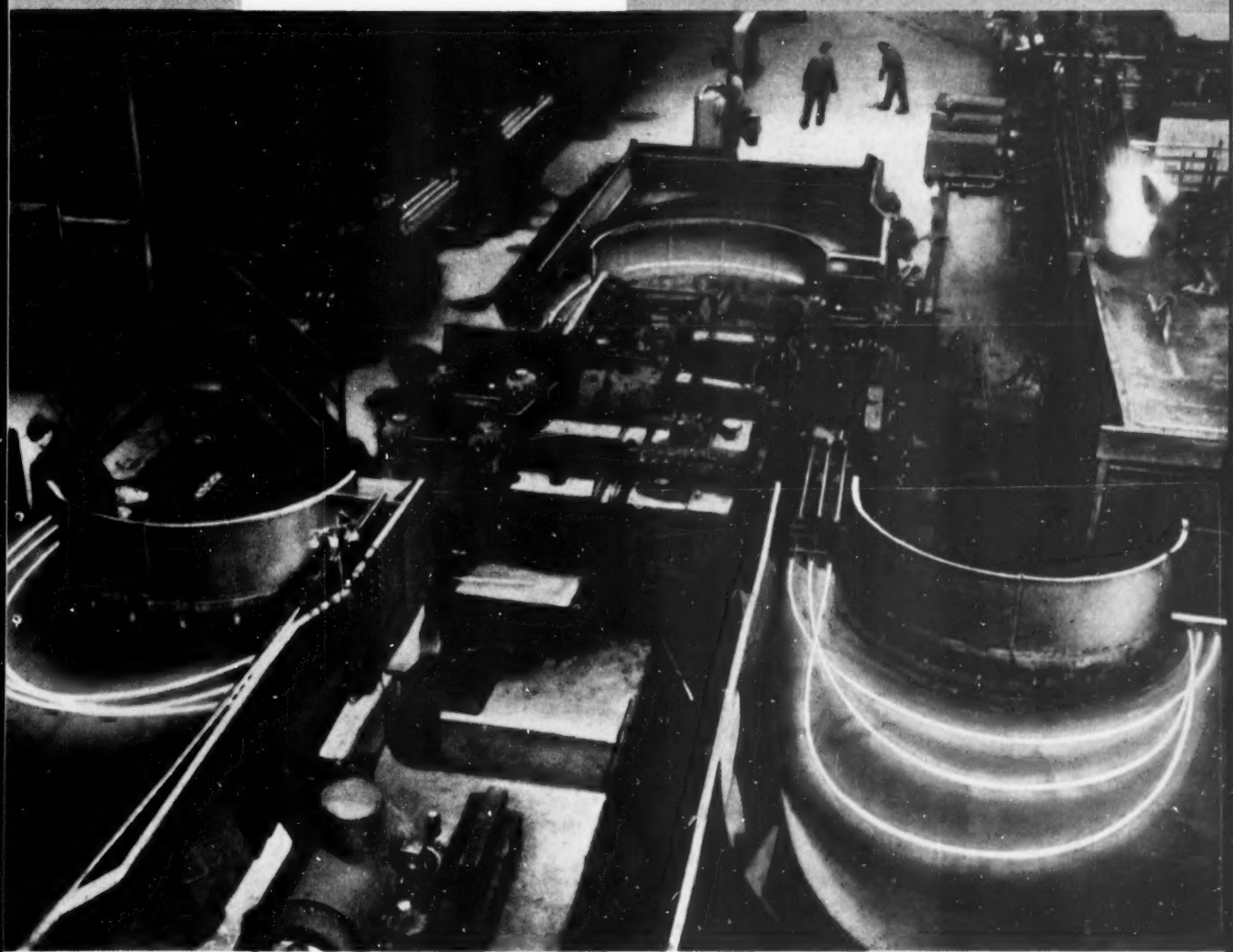
When desired speed of the flywheel has been attained, the motor automatically uncouples from the gyro, and its job is done. Seconds or minutes later, depending on the distance from the submarine to its objective, the torpedo strikes its mark and blasts the target apart.

A standard 25-hp motor for industrial use is some 16 inches in diameter, 22 inches long and weighs 415 pounds. This one is 3½ inches in diameter and 10 inches long.

UNITED

RENDLEMAN ROD MILL

HIGHER PRODUCTION RATE THAN ATTAINED ON ANY OTHER ROD MILL *



Designed and Built by

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at PITTSBURGH • VANDERGRIFT • NEW CASTLE
YOUNGSTOWN • CANTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
LOBDELL UNITED COMPANY, WILMINGTON, DELAWARE
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

*

- **CONDITIONING OF BILLETS UNNECESSARY.**
- **FEWER ROLL CHANGES REQUIRED.**
- **LOWER ROLL and GUIDE MAINTENANCE COST.**
- **BETTER QUALITY RODS AT LOWER COST.**

UNITED *can serve you no matter where in the world you are.*

THE AMERICAN STORY

CHAPTER ELEVEN

These slaves, too, have been freed!

Up until about 20 years ago, assembly with slotted screws was one of the slave jobs of industry . . . hit or miss, slip and slash, nerve-racking to workers and often destructive to work.

Then American gave industry the Phillips Cross-Recessed Head Screw, with screw and power-driver aligning themselves *automatically* into a single straight-driving unit. Right then and there the drudgery ended, production increased (often as much as 50%), while work-spoilage dropped to the vanishing point. And those who have adopted this modern fastening method find that *American Phillips Screws always cost least to use.* American engineers will prove this to you, on your own assemblies, any time you say.

SINCE 1838

AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.

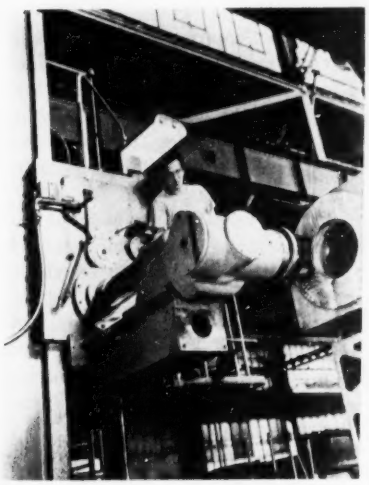
Pacific Coast Goliath

Combination horizontal boring, drilling and milling machine is biggest in West

A SERIES 50 horizontal boring, forced to permit removal of a main largest machine tool of its kind on the Pacific Coast, is working around the clock in three shifts at the Torrance, Calif., plant of National Supply Co.

Manufactured by the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., the huge unit represents the latest in machine tool design. It is a floor-type machine on which the work remains stationary, with the seven-inch main spindle traversing past the work.

Vital Statistics—National Supply uses the unit on work of such size, weight, or shape as to make



FACE MILLING A STRETCH PRESS
. . . easy for this giant machine

machining impractical on other type equipment. The company's Torrance plant manufactures oil field machinery and equipment, as well as machinery for many other industrial uses. It is generally considered to be the largest completely intergrated machinery manufacturing plant in the West.

Spindle of the Series 50 machine covers an area 24 feet long and eight feet high. A floor plate, 24 feet long and 12 feet wide, is provided for setup of the work piece.

Reinforced Building—Elaborate preparations were required before the machine could be installed. The machine shop building was reinforced to permit removal of a main supporting column that interfered with the machine's full travel. The foundation of an old planer was removed in order to excavate for a foundation that included 108 yards of concrete. Electric power lines were laid underground from the generator room of the shafting department, a distance of nearly 1000 feet.

Installs Big Selenium Rectifier

Completion of a single cubicle selenium rectifier with an output capacity of 30,000 amperes of dc power at 12 volts, and occupying only 96 sq ft of floor space, has been announced by Bart-Messing Corp., Belleville, N. J.

Rectifier, said to be the largest single cubicle unit ever built, is being installed at the Walsh Holyoke Division plant of Continental Copper and Steel Industries Inc., S. Portland, Me.

It will be used to furnish low voltage dc power for electroplating nickel-lined steel pipe for Atomic Energy Commission projects.

Reduce Your Product Cost with...
ROURA Self-Dumping HOPPERS

Only ROURA Has The Exclusive PATENTED Instant Release Handle

—they pay for themselves

Meaning more than selling any one job are the business principles that stand behind a product's manufacture — quality construction is foremost with Roura Hoppers.

Long-lived Roura Hoppers have submerged arc welds — they are "stitched" with the same apparatus used for "stitching" high pressure steam boilers.

Handling wet or dry, hot or cold, bulky materials quickly and easily, the ROURA is simple to operate—only one man is required for distributing and unloading—and he does this in much less time than ordinarily required under old-fashioned manual methods. Thousands of Roura Hoppers (which fit any standard fork or platform lift truck) are in constant daily operation, serving and saving for such firms as Owens-Illinois Glass, Corning Glass, National Fireproofing, General Motors, Ford, Chrysler, American Brake Shoe, General Electric, Westinghouse, Western Electric, American Steel Foundries, International Harvester, John Deere, etc.

By a simple lift of the exclusive release handle, the ROURA HOPPER dumps, rights and locks itself securely. Sizes—½, ¾, 1, 1½ and 2 cubic yards; the ROURA HOPPER can also be designed for flat trucks and in other sizes to meet specifications. Also, it can be equipped with special flanges that permit stacking to desired tiers for storage or future distribution of materials—conserving valuable floor space. Priced below all competition, the ROURA will quickly pay for itself many times over.

—Can Be Coated With Acid-Resistant Paints

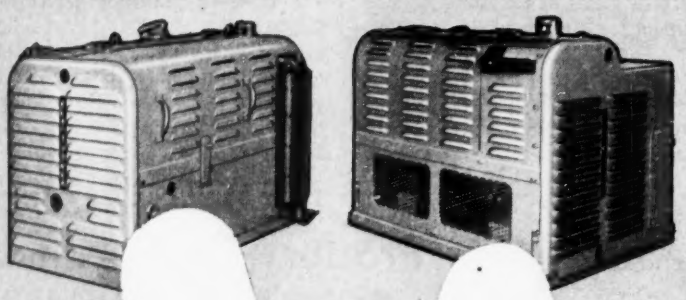
Write today for detailed brochure, "In Dollars & Sense."

SIMPLE
SAFE
SPEEDY
MATERIAL HANDLING

ROURA IRON WORKS, Inc.
1421 Woodland Ave. Detroit 11, Mich.

READY-POWER

GAS-ELECTRIC **DIESEL-ELECTRIC**



Now... 2 Types of Continuous-Duty Power Units

FOR ALL ELECTRIC TRUCKS

Now you can select either gas-electric or Diesel-electric Ready-Power for *any* size or make of electric truck. GAS-ELECTRIC Models are for the tough materials handling jobs . . . DIESEL-ELECTRIC Models master the "impossible" jobs that keep trucks going day and nite, year after year. Ready-Power continuous-duty drive operates electric trucks at the lowest known costs per ton mile! Write us for additional information.

Ready-Power Units are the ONLY INTERCHANGEABLE power units for all types and makes of electric trucks.

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

New Alloy Analyzer

A METHOD has been developed whereby an analysis of a multiple component alloy can be made using only the measured values of intensity of the fluorescent radiation for each of the elements comprising the alloy. It is no longer necessary to use a calibration curve to determine composition. A number of stainless steels in which the iron ranges between 2 and 60 per cent, the nickel ranges between 10 and 75 per cent, and the chromium between 10 and 25 per cent, have been successfully analyzed using this method.

This information was revealed by Gordon E. Noakes, research engineer for Ford Motor Co., Dearborn, Mich., in a paper delivered at the annual meeting of American Society for Testing Materials in Philadelphia.

Develop Equation—An equation, relating the fluorescent radiation emitted by an element in an alloy and the weight percentage of other elements in the alloy, has been developed and tested. Coefficients in this equation determine the effect of the presence of an element on the fluorescent radiation emitted by another. The values of these coefficients have been determined under standardized conditions of excitation of the primary incident beam. Significance of these values is discussed in an outline of the theory of the method.

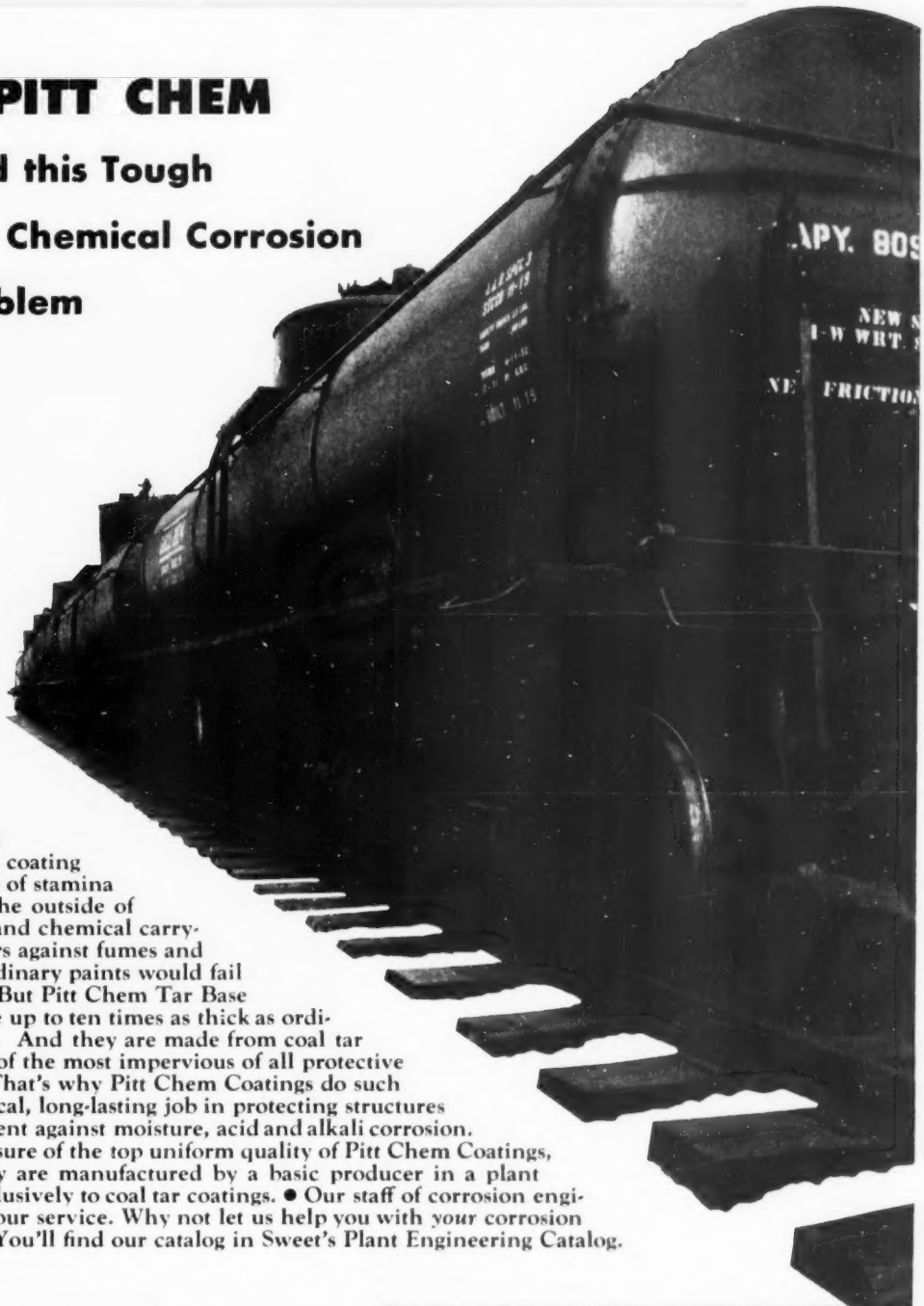
Method could be extended to other elements in addition to those present in stainless steels and the coefficients determined could be used by any other laboratory using similar equipment under the same conditions.

Flameproof Clothes Halt Burns

Flameproof cotton clothing on workers in intense heat areas of a steel mill has lowered by 88 per cent the number of body burn cases at the Pittsburgh works of Jones & Laughlin Steel Corp., a survey of safety records discloses. The study shows that burn injuries have averaged less than 2 cases per year since the special clothing was introduced in 1948, compared with an annual average of 11 cases reported in previous years.

PITT CHEM

Licked this Tough Chemical Corrosion Problem



IT TAKES a protective coating with plenty of stamina to protect the outside of these acid and chemical carrying tank cars against fumes and spillage. Ordinary paints would fail in months. But Pitt Chem Tar Base Coatings are up to ten times as thick as ordinary paints. And they are made from coal tar pitch—one of the most impervious of all protective materials. That's why Pitt Chem Coatings do such an economical, long-lasting job in protecting structures and equipment against moisture, acid and alkali corrosion. You can be sure of the top uniform quality of Pitt Chem Coatings, because they are manufactured by a basic producer in a plant devoted exclusively to coal tar coatings. ● Our staff of corrosion engineers is at your service. Why not let us help you with *your* corrosion problems? You'll find our catalog in Sweet's Plant Engineering Catalog.

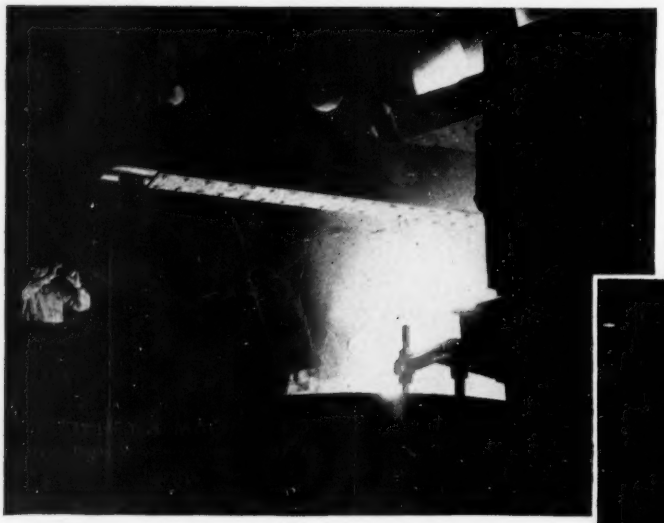
PITT CHEM 101—For Severest Conditions
PITT CHEM 102—Maintenance Coating
PITT CHEM 103—General Purpose Coating
PITT CHEM 104—Potable Water Service
PITT CHEM 105 AQUATAR—A Water Dispersion
PITT CHEM 106 TARMASTIC—Sealing Compound
PITT CHEM 107 PACHKOTE—Specialty Coating
PITT CHEM 110—Specialty Coating

W&D 4667

PROTECTIVE COATINGS DIVISION
PITTSBURGH COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

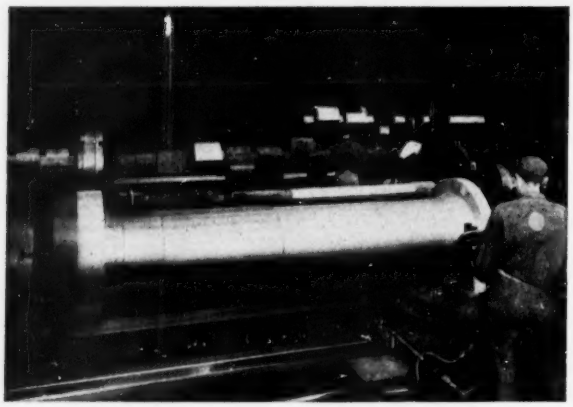
COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

HERE'S THE STORY OF YOUR FORGINGS AT NATIONAL FORGE AND ORDNANCE CO.

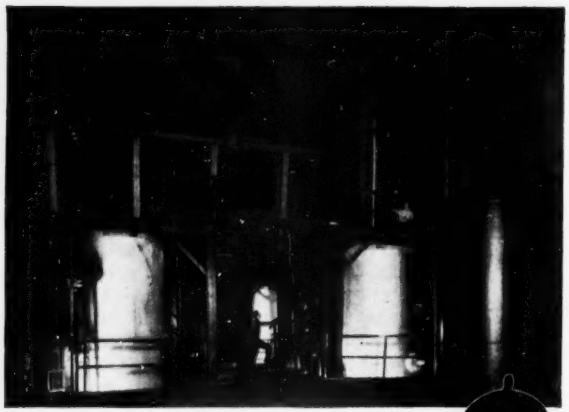


1. Basic Electric Steel is made for all forgings.

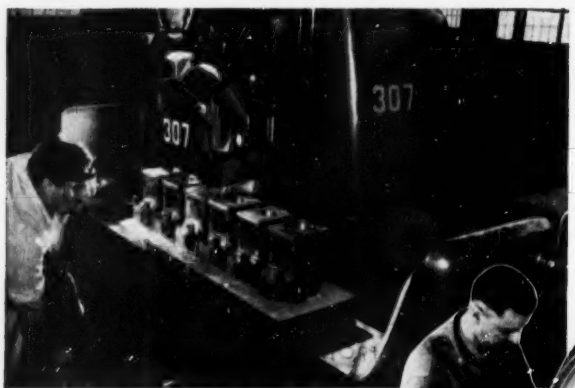
2. Forgings are made from Ingots of proper size for the best final result.



3. Forgings are rough-machined before heat treatment to insure greatest uniformity.

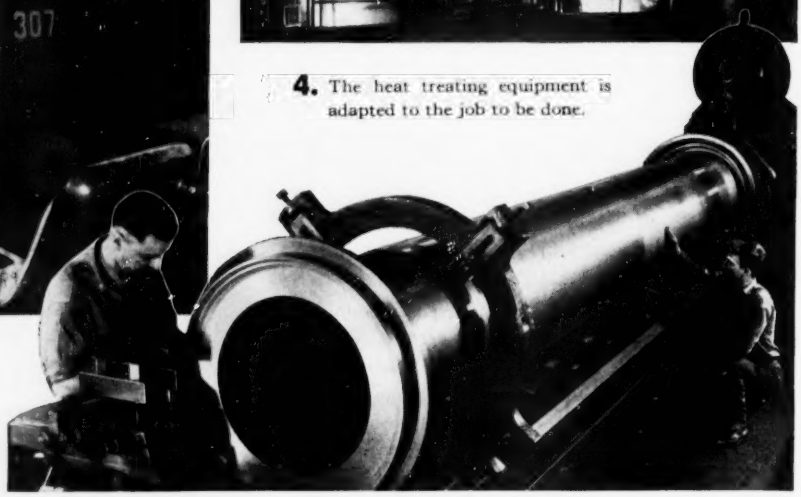


4. The heat treating equipment is adapted to the job to be done.



5. National Forge can make your forgings—large or small—rough or finished.

6. Precision is a by-word at National Forge.



NATIONAL FORGE AND ORDNANCE CO., IRVINE, WARREN CO., PENNA.

New Books

Stress, Deformation Theories

FATIGUE AND FRACTURE OF METALS, by William M. Murray; cloth, 313 pages; 6 x 9 inches; published by Technology Press, Massachusetts Institute of Technology and John Wiley & Sons Inc., New York, for $6.00; available from STEEL, Penton Bldg., Cleveland 13, O.

This symposium consists of 14 papers that were presented at a conference on the fatigue and fracture of metals at the Massachusetts Institute of Technology in 1950, for the purpose of focusing present knowledge of this problem and indicating paths for future research. Papers and authors included are:

General Survey of the Problem of Fatigue and Fracture, M. Gensamer; Fatigue Problem in Airplane Structures, H. L. Dryden, R. V. Rhode and P. Kuhn; Brittle Fracture and Fatigue in Ships, F. Jonassen; Brittle Fracture and Fatigue in Machinery, R. E. Peterson; Internal Stresses and Fatigue, O. J. Horger and H. R. Neifert; Designing for Fatigue, R. L. Templin; Fundamentals of Brittle Behavior in Metals, E. Orowan; Experimental Study on Temper Brittleness of Slightly Alloyed Carbon Steel, P. A. Jacquet and A. R. Weill; Statistical Aspect of Fatigue Failures and its Consequences, W. Weibull; Review of Cumulative Damage in Fatigue, N. M. Newmark; Significance of Transition Temperature in Fatigue, C. W. MacGregor; Influence of Metallographic Structure on Fatigue, P. L. Teed; Fatigue at Elevated Temperatures, N. J. Grant; Techniques of Physical Metallurgy for Studying Fatigue Damage, J. T. Norton.

Data Book for Engineers

TOOL ENGINEERS' DATA BOOK, by Gerhard J. Gruen; cloth, 219 pages, 9¼ x 6 inches; published by Reinhold Publishing Corp., New York, for $5.50; available from STEEL, Penton Bldg., Cleveland 13, O.

This book gives tables, formulas, constants and specifications needed by the practicing tool engineer and designer. All explanations of theoretical concepts and descriptive material have been omitted, as have obsolete material and tabular matter not directly related to the work of the tool engineer.

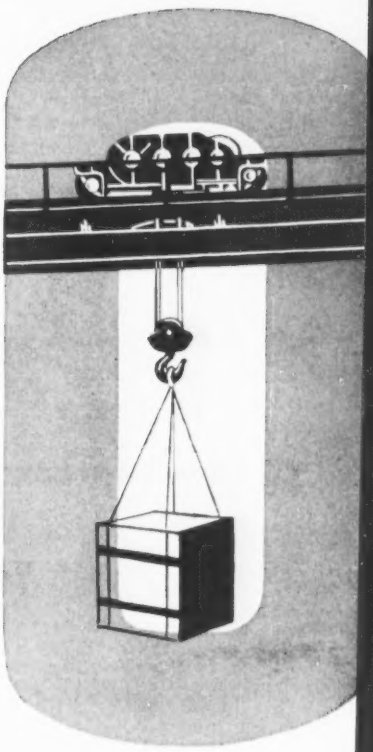
Complete data is included on the general properties of special alloys, heat treatment of special alloys and stainless steels, spot identification of metals, alloys and plastics, blank size diameters for shells and other information. Also included are conversion tables, mathematical tables and a glossary of metallurgical terms.

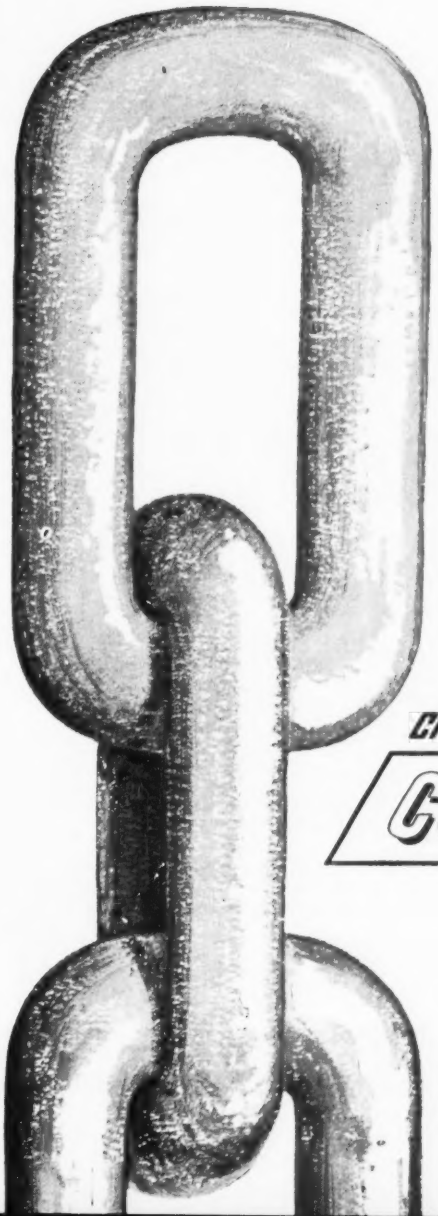
First of Alloy Series

ALUMINUM IN IRON AND STEEL, by Samuel L. Case and Kent R. Van Horn; cloth, 478 pages, 9¼ x 6 inches; published by John Wiley & Sons Inc., New York, for $8.50; available from STEEL, Penton Bldg., Cleveland 13, O.

The first part of this book contains a summary of data showing

is this ⇨ the MISSING LINK?





Strong link in your production chain can be a Conco Crane — custom-designed for a specific need. Conco Cranes are available in the capacity you need, the right lift, the right speed, the right clearances to serve a given station faster, at less cost, with less man power. Conco Cranes are backed by 36 years experience in the design of cranes, hoists, trolleys. Write for Bulletin 3000A illustrating and describing the Conco line.

CRANES HOISTS

CONCO

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company

70—14th Avenue, Mendota, Illinois

AFFILIATES:

Conco Engineering Works - Domestic Heating Equipment

Conco Building Products, Inc., Brick, Tile, Stone

the favorable effect of small amounts of aluminum when added to molten steel as a deoxidizer. The second part presents a correlation of data on the effect of aluminum as an alloying element in steel. The phenomena of inclusion formation, grain size, notch sensitivity, and aging are extensively treated. Material for the book was drawn from over 340 sources.

This volume sets the pattern for forthcoming books in the monograph series which includes the following: Aluminum in Iron and Steel; Nickel in Iron and Steel; Manganese in Iron and Steel; Titanium in Iron and Steel, Columbium, Zirconium, Boron, Tantalum, and Calcium in Iron and Steel; and The Principles of the Heat Treatment of Steel.

Modern Ferrous Analysis

FERROUS ANALYSIS—MODERN PRACTICE AND THEORY, by E. C. Pigott; second edition revised; cloth, 690 pages, 9 x 5½ inches; published by John Wiley & Sons Inc., New York, for $12.50; available from STEEL, Penton Bldg., Cleveland 13, O.

The aim of this book is to conform to practical requirements by providing methods of analysis that will fall within the scope of the average laboratory, and that are reliably selective and accurate, rapid and economical, and of general application.

It is composed of five sections: Analytical Techniques, The Constituents of Iron and Steel, Microchemical Analysis of Iron and Steel, Alloys and Ores, and Refractory Materials.

The volume includes absorptiometric technique, the discriminate use of which greatly abbreviates colorimetric work and raises it to the volumetric level of precision. This technique is exploited also in microchemical methods, applicable where only a small amount of sample is available. Reliable spot tests for the various constituents form another feature, which should aid the sorting of mixed materials.

Science History

HISTORY OF STRENGTH OF MATERIALS, by Stephen P. Timoskenko; cloth, 452 pages, 9¼ x 6 inches; published by McGraw-Hill Book Co. Inc., New York, for $10.00; available from STEEL, Penton Bldg., Cleveland 13, O.

This book presents the history of the development of the science of strength of materials from its beginnings to the present.

The author includes portions of the histories of the sciences of theory of elasticity and theory of structures which have a close connection with and bearing upon the major subject.

The text treats the developments of the sciences by periods of history. Within these periods, major contributions made by prominent scientists and engineers are related in brief biographies.

There are discussions which bring together the progress of strength of materials with the state of engineering education and with development of industries in various countries. These considerations include the modern effects of railroad transportation, the use of steel as a major structural material, and the development of combustion engines and light airplane structures.

PMI Publishes Blue Book

The 1953 edition of Pressed Metal Institute's Blue Book of Stamping Manufacturers lists facilities and services of all member companies. It also contains a statement of policy to customers.

Copies are available to all members and customers of the industry by writing the institute, 2860 E. 130th St., Cleveland, 20.

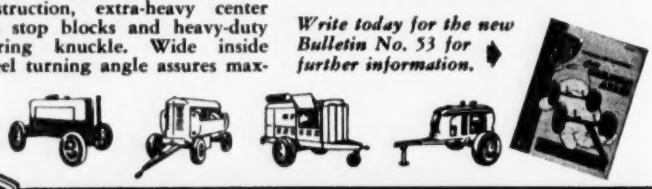
...ON CARAVAN AXLES

Rutted ground or high grade highway . . . equipment mounted on CARAVAN axles is ready to roll over any surface. These quality-built assemblies assure positive trail at high speeds as well as stability for the heaviest equipment over the roughest ground.

CARAVAN axles feature double-acting spring cushioned draw bar to minimize stopping and starting shock, sturdy solid steel axle beam construction, extra-heavy center arm stop blocks and heavy-duty steering knuckle. Wide inside wheel turning angle assures maximum maneuverability and eliminates jack-knifing.

CARAVAN units are available as single-axle two-wheel assemblies and as four-wheel running gear equipped with automotive type steering. They are recommended for mounting military and industrial equipment as well as field service and construction machinery weighing up to 14,000 lbs.

Write today for the new Bulletin No. 53 for further information.



5169-UM

THE UNITED MANUFACTURING CO.

719 INTERSTATE STREET • BEDFORD, OHIO

Parts cleaning time slashed 80 per cent

Bearings cleaned faster, more thoroughly, by G-E Ultrasonic Generator

Miniature Precision Bearings, Inc., of Keene, New Hampshire, manufacturers of precision ball bearings in miniature sizes, has reduced cleaning time of ball-bearing parts by more than 80 per cent by adopting a General Electric Ultrasonic Generator.

In manufacturing these small bearings, each part must be measured and tested many times during fabrication. This manufacturer formerly used forced-air cleaning and time-consuming hand dipping to clean components. Now, with ultrasonic irradiation, fifty parts can be cleaned by one operator in less than one minute to meet rigid inspection—cutting rejects of assembled bearings.

G-E ULTRASONIC GENERATOR has been found increasingly effective for cleaning of small parts; cleans in inaccessible corners, small holes, and wherever complicated shapes exist; speeds cleaning in a 10-to-1 or even 100-to-1 ratio.

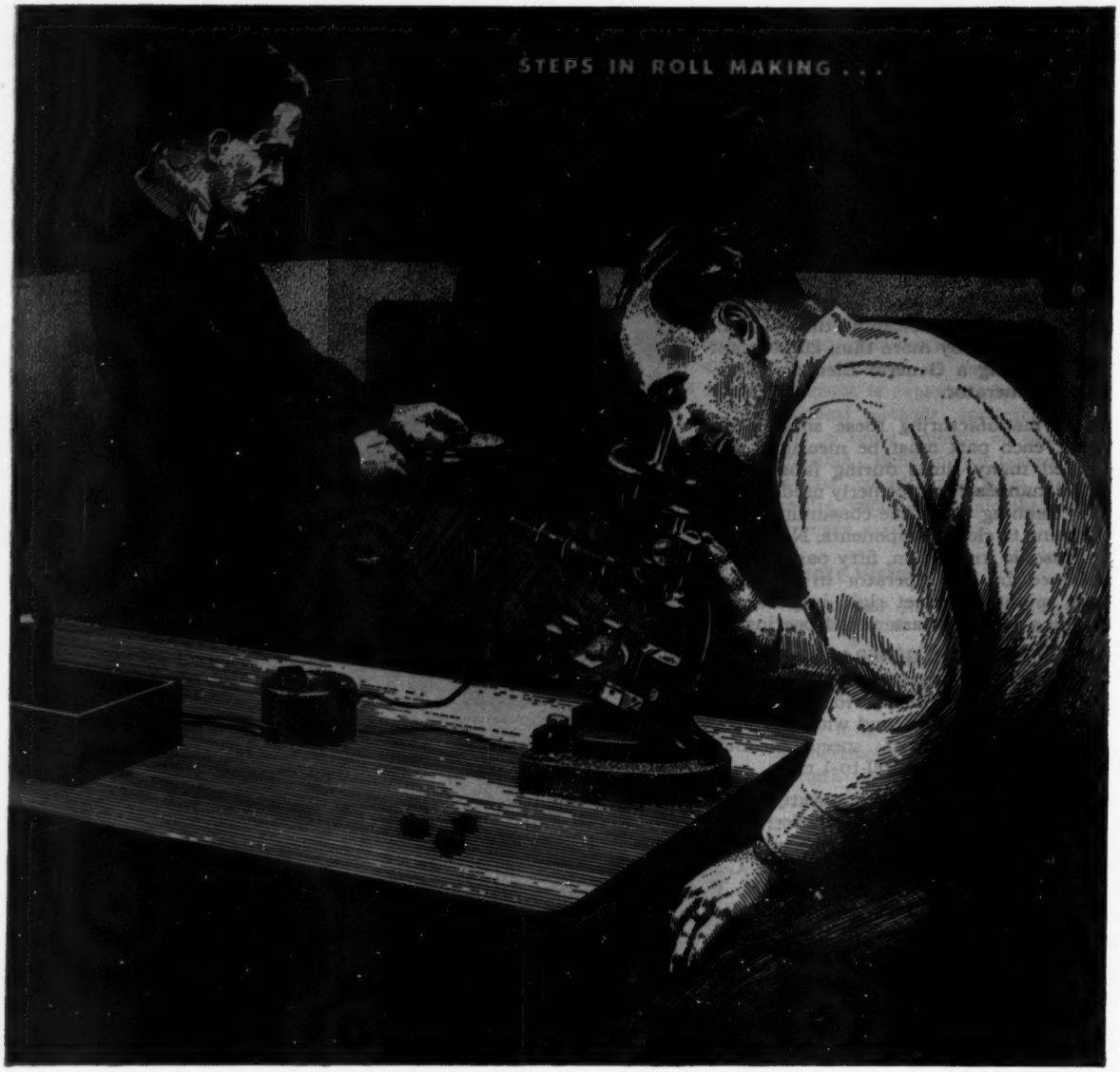
Your nearest G-E Apparatus Sales Office will furnish further information on ultrasonic cleaning, or send your specifications to General Electric Co., Section 687-128, Schenectady 5, N. Y. Send for your free copy of Bulletin GEA-5669 on ultrasonic cleaning.

50 PRECISION PARTS can be placed in the beaker and cleaned in less than one minute with ultrasonics. Cleaning can be done with either alkaline or hydrocarbon solvents.

EASY OPERATION of ultrasonic generator eliminates cleaning bearings with cumbersome baths, and cuts handling time. Other users report ultrasonic cleaning easily removes waxes, oils, greases, and even residual metal chips.

You can put your confidence in—

GENERAL ELECTRIC



WHY RESEARCH MEANS BETTER ROLLS

At National, continuous investigation of the behavior of iron and steel serves two purposes. The immediate purpose is to control quality of current roll production through analysis of metallurgical specimens. The long range purpose is to search for new formulas and for new and better iron and steel alloys that will keep pace with the technological advance of the steel producing industry. • The results of such a research policy are reflected in the quality and durability of the rolls that National has been producing for forty-five years.

NATIONAL ROLLS

National Rolls

THE NATIONAL ROLL & FOUNDRY CO.

AVONMORE, PENNSYLVANIA

SPECIALISTS IN IRON, ALLOY IRON AND STEEL ROLLS AND CASTINGS, STEEL ARMOR CASTINGS

STEEL
July 13, 1953

Market Outlook

IT LOOKS more and more like there'll be a good demand for steel through the fourth quarter of this year.

That's the quarter a lot of people thought would bring a downfall. Earlier this year there were predictions the shrinkage would come in the third quarter. But as time went by, the date for a decline was postponed.

ENCOURAGING— Steel company sales executives are increasingly optimistic about the fourth-quarter sales prospects for the large tonnage items like sheets, plates, structural shapes, bars and seamless tubing. Those products comprise more than half of the tonnage of finished steel shipped by mills. It's significant that steel company executives are optimistic. They're noted for conservatism.

ON THE ALERT— Even though they're surprisingly optimistic over fourth-quarter prospects they're being alert for any sudden turns that would darken the outlook. They're paying particularly close attention to the auto industry. It's the biggest consumer of steel.

Automakers are still displaying optimism, and they have set 628,100 cars as their production goal for July. This is almost 50,000 units above the number built in June.

If need be, a little sales effort by the auto dealers might help keep auto production high, some observers suggest. Have you been approached recently by an auto salesman? Many people haven't! In one office, for example, only one man out of 16 had been contacted personally by a seller of new cars.

LIMITED EFFECT— Any reduction that may occur in demand for fourth-quarter delivery of steel is expected to affect only the tonnage that has to sell at premium prices. All of the premium-priced business could wash out before there would be any effects on producers selling at regular prices. One steel market analyst thought all of the premium-priced business could disappear and still leave the national ingot production rate at 90 per cent of capacity.

One facet of the premium-priced business is conversion steel. While consumers are more cautious than they were in signing up for conversion steel, interest in it is definitely not dead.

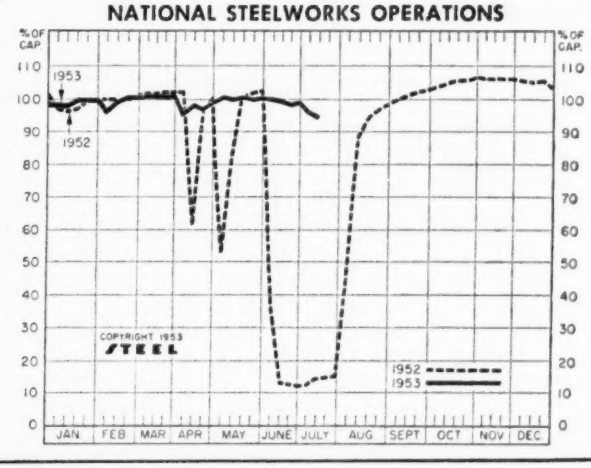
CUSHION— Even if steel demand should subside somewhat in the fourth quarter some of the slack is expected to be taken up by carryover of unfilled orders from the third quarter. In some products it appears now there will be a carryover of two to three weeks.

While there's growing optimism over the fourth-quarter outlook for steel demand, you can find differences of opinion.

ABSORBING FREIGHT— On some of the slower moving products, competition is forcing producers to start absorbing some of the freight charges. A producer of electricweld mechanical tubing has begun to absorb freight and there are reports that pig iron producers are doing likewise in one area. However, steel producers feel that no widespread absorption of freight will be necessary until after all of the premium-priced steel fades away.

ON VACATION— With summer vacations in full swing in steel plants, output of steel for ingots and castings in the week ended July 11 declined 1.5 points from the preceding week and registered 94.5 per cent of capacity.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended July 11	Change	Same 1952	Week 1951
Pittsburgh	97	+ 4.5*	7.5	97
Chicago	98.5	— 3.5*	5.5	106.5
Mid-Atlantic	97.5	+ 1	17	101
Youngstown	93	0	6	105
Wheeling	97	— 2	49.5	97
Cleveland	104	+ 6.5*	0	96.5
Buffalo	106.5	0	0	104
Birmingham	101	+ 1.5	0.5	100
New England	70	—13	20	76
Cincinnati	100.5	+ 1.5	36.5	104
St. Louis	85	—22*	31	90.5
Detroit	105	0	46	100
Western	105	— 2	33	101
Estimated National Rate	94.5	— 1.5	14.5	101.5

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,419 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

The Metalworking Outlook—p. 49 Technical Outlook—p. 97

Composite Market Averages

FINISHED STEEL PRICE INDEX: Bureau of Labor Statistics	July 7 1953	June 30 1953	Month Ago	June Average
(1947-1949=100)	141.8	141.8	136.6	136.6

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended July 7, 1953

Units are 100 lb except where otherwise noted. For complete description of products see insert following p. 28, STEEL, Sept. 8, 1952.

Rails	$4.325	Sheets, C.R., carbon	$5.825
Track spikes	7.050	Sheets, galv.	6.965
Track bolts	11.000	Strip, C.R., carbon	5.450
Tie plates	5.125	Strip, C.R., stainless (lb)	0.348
Joint bars	5.275	Pipe, black, buttweld (100 ft)	7.773
Plates, carbon	4.488	Pipe, galv., buttweld (100 ft)	9.439
Structural shapes	4.650	Boiler tubes (100 ft)	37.020
Bars, tool steel (lb)	1.660	Tin plate (100 lb base box)	8.950
Bars, 3120 alloy	7.225	Terne plate (100 lb base box)	7.750
Bars, stainless (lb)	0.160	Wire, carbon, merchant	6.692
Bars, carbon	4.600	Wire, fence, galv.	7.317
Bars, reinforcing	4.450	Nails (100 lb kegs)	7.630
Bars, CF., carbon	6.550	Wire, barbed (80 rod spool)	6.360
Sheets, H.R., carbon	4.525	Woven wire fence (20 rod roll)	14.271

FINISHED PRICE INDEX, Weighted: Calculated by STEEL*

	July 9 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.18	189.18	182.82	171.92	143.08
Index in cents per lb.	5.125	5.125	4.953	4.657	3.876

ARITHMETICAL PRICE COMPOSITES: Calculated by STEEL*

Finished Steel NT	$114.84	$114.53	$111.28	$106.32	$80.27
No. 2 Fdry, Pig Iron, GT	56.54	56.54	55.04	52.54	40.96
Basic Pig Iron, GT	56.04	56.00	54.66	52.16	40.49
Malleable Pig Iron, GT	57.27	57.27	55.77	53.27	41.54
Steelmaking Scrap, GT	43.17	43.17	39.50	42.33	40.67

* For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	July 9 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	3.95	3.70	2.875
Bars, H.R., Chicago	4.15	4.15	3.95	3.70	2.875
Bars, H.R., del. Philadelphia	5.302	5.302	4.502	4.252	3.365
Bars, C.F., Pittsburgh	5.20	5.20	4.925	4.55	3.50
Shapes, Std., Pittsburgh	4.10	4.10	3.85	3.65	2.775
Shapes, Std., Chicago	4.10	4.10	3.85	3.65	2.775
Shapes, del., Philadelphia	4.38	4.38	4.13	3.93	2.98
Plates, Pittsburgh	4.10	4.10	3.90	3.70	2.925
Plates, Chicago	4.10	4.10	3.90	3.70	2.925
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.45
Plates, Sparrows Point, Md.	4.10	4.10	3.90	3.70	2.95
Plates, Claymont, Del.	4.55	4.55	4.35	4.15	3.65
Sheets, H.R., Pittsburgh	3.925	3.925	3.775	3.60-75	2.775
Sheets, H.R., Chicago	3.925	3.925	3.775	3.60	2.775
Sheets, C.R., Pittsburgh	4.775	4.775	4.575	4.35	3.50
Sheets, C.R., Chicago	4.775	4.775	4.575	4.35	3.50
Sheets, C.R., Detroit	4.975	4.975	4.775	4.55	3.71
Sheets, Galv., Pittsburgh	5.275	5.275	5.075	4.80	3.90
Strip, H.R., Pitts.	3.975-4.425	3.975-4.425	3.975-4.225	3.75-4.00	3.05
Strip, H.R., Chicago	3.925	3.925	3.725	3.50	2.775
Strip, C.R., Pittsburgh	5.45-5.95	5.45-5.95	5.10-5.80	4.65-5.35	3.775
Strip, C.R., Chicago	5.70	5.70	5.35	4.90	3.60
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.30-6.05	4.85-5.60	3.71
Wire, Basic, Pitts.	5.475-5.525	5.475-5.525	5.475-5.225	4.85-5.10	3.725
Nails, Wire, Pittsburgh	6.35-6.55	6.35-6.55	6.35	5.90-6.20	5.125
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.70	$6.60
SEMIFINISHED					
Billets, forging, Pitts.(NT)	$75.50	$75.50	$70.50	$66.00	$54.00
Wire rods, ⅜-⅝", Pitts.	4.525	4.525	4.425	4.10-30	3.175
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$55.50	$53.00	$43.00
Basic, Valley	56.00	56.00	54.50	52.00	39.00
Basic, del. Phila.	60.75	60.75	59.25	56.75	42.47
No. 2 Fdry, Pitts.	56.50	56.50	55.00	52.50	42.50
No. 2 Fdry, Chicago	56.50	56.50	55.00	52.50	39.00
No. 2 Fdry, Valley	56.50	56.50	55.00	52.50	39.50
No. 2 Fdry, del. Phila.	61.25	61.25	59.75	57.25	42.67
No. 2 Fdry, Birm.	52.88	52.88	51.38	48.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	58.93	56.43	45.09
Malleable, Valley	56.50	56.50	55.00	52.50	39.50
Malleable, Chicago	56.50	56.50	55.00	52.50	39.50
Ferromanganese, Etna, Pa.	200.00†	200.00†	200.00†	188.00‡	151.00*

*F.o.b. cars, Pittsburgh; 78-82% Mn, per gross ton. †74-76% Mn, per net ton. ‡78-82% Mn, per gross ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.50	$44.50	$39.50	$44.00	$40.25
No. 1 Heavy Melt, E. Pa.	43.50	43.50	41.50	41.00	42.50
No. 1 Heavy Melt, Chicago	41.50	41.50	37.50	42.50	39.25
No. 1 Heavy Melt, Valley	45.50	45.50	41.50	44.00	40.25
No. 1 Heavy Melt, Cleve.	44.50	43.50	39.00	43.00	39.75
No. 1 Heavy Melt, Buffalo	40.75	40.75	40.75	37.00	44.00
Rails, Rerolling, Chicago	54.00	50.00	47.50	52.50	54.50
No. 1 Cast, Chicago	41.00	40.00	38.00	45.00	65.50

†F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.00
Beehive, Fdry, Connlsvl.	17.00	17.00	17.00	17.50	15.50
Oven Fdry, Chicago	24.50	24.50	24.50	23.00	19.50

PIG IRON

F.o.b. furnace prices as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies on page 165.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$58.00	$58.50	$59.00	$59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Philadelphia, del.	60.75	61.25	61.75	62.25
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham S9	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	....	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	....
Buffalo H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14	56.00	56.50	56.50	....
So.Chicago,Ill. Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.61	59.11	59.11	59.61
Lorain,O. N3	56.00	....	....	57.00
Duluth I-3	....	....	56.50	....
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	....	63.25	63.75	....
Fontana,Calif. K1	*62.00*	*62.50*	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
Lone Star,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	56.50	57.50	57.50	....
Rockwood,Tenn. T3	....	....	58.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	....
Pitts.,N.&S. sides, Ambridge, Aliquippa, del.	57.37	57.87	57.87	....
McKeesRocks, del.	57.04	57.54	57.54	....
Laurenceville, Homestead, Wilmerding, Monaca, del.	57.66	58.16	58.16	....
Verona, Trafford, del.	58.19	58.69	58.69	....
Brackenridge, del.	58.45	58.95	58.95	....
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	*56.00*	....	....	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	60.00	60.50	61.00	61.50
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.47	61.97	....	....
Troy,Nn.Y. R2	58.00	58.50	59.00	....
Youngstown District				
Hubbard,O. Y1	56.00	56.50	56.50	....
Youngstown Y1	56.00	56.50	56.50	....
Youngstown U5	56.00	....	....	57.00
Mansifeld,O., del.	60.65	61.15	61.15	61.65

*Low phos, southern grade

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.50
Keokuk,OH & Fdry, 12½ lb pigiets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., OH & Fdry, freight allowed K2	92.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate, A7	$61.00
Rockwood,Tenn. T3	68.50
Steelton,Pa. B2	64.00
Philadelphia, delivered	67.55
Troy,N.Y. R2	64.00

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 29.75-30.00c, Conn. Valley; Lake 30.125c; foreign electrolytic, deld., 29-75-30.00c.

Brass ingots: 85-5-5-5 (No. 115) 26.00c; 88-10-2 (No. 215) 34.75c; 80-10-10 (No. 305) 30.00c; No. 1 yellow (No. 405) 21.25c.

Zinc: Prime western 11.00c; brass special 11.25c; intermediate 11.50c; East St. Louis; high grade 12.35c; special high grade 12.50c deld.

Lead: Common 13.30c; chemical 13.40c; corroding 13.40c; St. Louis.

Primary Aluminum: 99% plus, ingots 20.50c, pigs 19.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 23.00-23.75; No. 12 foundry alloy (No. 2 grade) 22.50-23.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75-24.50; grade 2 23.00-23.75; grade 3, 22.00-22.50; grade 4, 21.00-21.50.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 27.00c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt RFC, 121.50c; outside market 83.00c.

Antimony: American 99-99.8% and over but not meeting specifications below 34.50c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 35.00c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 60.00c; 25-lb pigs 62.65c; "XX" nickel shot, 63.65c; "F" nickel shot or ingots, for addition to cast iron, 60.00c. Prices include import duty.

Mercury: Open market, spot, New York, $185-$194, per 76-lb flask.

Cadmium: "Regular" straight or flat forms, $2 deld.; special or patented shapes $2.15.

Beryllium-Copper: 3.75-4.25% Be, $40.00 per lb of contained beryllium, with balance as copper at market price on date of shipment, f.o.b. Reading, Pa. or Elmore, O.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open-market, New York 85.25c per oz.

Platinum: $93 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $165-$175 per troy ounce.

Titanium: (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Cents per pound, f.o.b. mill, effective Apr. 1, 1953. Listings are lowest quotations.)

Sheet: Copper 50.48; yellow brass 42.87; commercial bronze, 95% 49.89; 90% 48.76; red brass, 85% 47.11; 80% 45.99; best quality, 44.43; nickel silver, 18%, 59.84; phosphor-bronze grade A, 5%, 70.50.

Rod: Copper, hot-rolled 46.83; cold-drawn 48.08; yellow brass free cutting, 36.68; commercial bronze 95% 49.58; 90% 48.45; red brass 85%, 46.80; 80%, 45.68.

Seamless Tubing: Copper 50.42; yellow brass 45.78; commercial bronze, 90%, 51.32; red brass, 85% 49.92.

Wire: Yellow brass 43.16; commercial bronze, 95%, 50.18; 90%, 49.05; red brass, 85%, 47.40; 80%, 46.28; best quality brass, 44.72.

(Base prices effective July 8, 1953)

Copper Wire: Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36-37.46; 30,000 lb lots, 35.48-37.58; l.c.l. 35.98-38.08. Weatherproof, 100,000 lb, 36.28-37.85; 30,000 lb, 36.53-38.10; l.c.l., 37.03-38.60. Magnet wire del., 15,000 lb or more 41.83-43.93; l.c.l., 42.58-44.68.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders. Effective Jan. 22, 1953.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	32.9	...	...
0.135-0.096	12-48	33.4	...	...
0.095-0.077	12-48	34.1	31.8	36.3
0.076-0.061	12-48	34.7	32.0	36.5
0.060-0.048	12-48	35.0	32.2	36.8
0.047-0.038	12-48	35.5	32.6	37.1
0.037-0.030	12-48	35.9	33.0	37.8
0.029-0.024	12-48	36.5	33.3	38.3
0.023-0.019	12-36	37.1	34.0	39.0
0.018-0.017	12-36	37.9	34.6	39.9
0.016-0.015	12-36	38.8	35.4	41.1
0.014	12-24	39.8	36.4	42.4
0.013-0.012	12-24	40.9	37.1	43.4
0.011	12-24	41.9	38.3	45.0
0.010-0.0095	12-24	43.1	39.4	46.6
0.009-0.0085	12-24	44.3	40.7	48.5
0.008-0.0075	12-24	45.8	41.9	50.3
0.007	12-18	47.3	43.4	52.6
0.006	12-18	48.9	44.8	57.6

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	58.4	56.8	...	...
0.156-0.172	49.7	48.0	...	...
0.188	49.7	48.0	...	61.2
0.219-0.234	47.0	45.3	...	...
0.250-0.281	47.0	45.3	...	58.4
0.313	47.0	45.3	...	55.7
Cold-finished				
0.375-0.531	45.3	43.7	55.1	52.4
0.563-0.688	45.3	43.7	52.4	49.2
0.750-1.000	44.2	42.6	48.0	46.4
1.063	44.2	42.6	...	44.8
1.125-1.500	42.6	41.0	46.4	44.8
Rolled				
1.563	42.0	40.5	...	...
1.625-2.000	41.5	39.8	...	43.2
2.125-2.500	40.5	38.8	...	...
2.750-3.375	39.3	37.6	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) **Sheets:** Full rolls, 140 sq ft or more $18.50 per cwt; add 50c cwt 100 sq ft to 140 sq ft. Pipe: Full coils $18.50 per cwt. **Traps and bends:** List prices plus 30%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 20.75-21.75c; over 12-in. 20.75-21.75c.

"A" NICKEL

(Base prices f.o.b. mill effective Mar. 9, 1953) Sheets, cold-rolled 86.50c. Strip, cold-rolled 92.50c. Rods and shapes, 82.50c. Plates, 84.50c. Seamless tubes 115.50c.

MONEL

(Base prices f.o.b. mill effective July 1, 1953) Sheets, cold-rolled 67.50c. Strip, cold-rolled 70.50c. Rods and shapes, 65.50c. Plates 66.50c. Seamless tubes, 100.50c. Shot and blocks, 60.00c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb 58.00c-65.00c; 25 to 99 lb, 48.00c-55.00c; 100 lb to 5000 lb, 44.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 42.18c; oval 41.68c.

Nickel Anodes: Rolled, oval, carbonized, carloads 81.00c; 5000 to 29,999 lb, 83.00c; 500 to 4999 lb, 85.00c; 1 to 499 lb, 89.00c, f.o.b. Cleveland.

Nickel Chloride: In 100 lb bags; 10,000 lb and over, 37.00c; 5000 to 9900 lb, 38.00c; 400 to 4900 lb, 40.00c; 300 lb, 42.00c; 200 lb, 43.00c; 100 lb, 45.00c, f.o.b. Cleveland.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 71c per lb; 100 to 350 lb drums only, 100 to 600 lb 56.7c; 700 to 1900 lb, 54.3c 2000 to 9900 lb, 52.5c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on 93-cent tin.

Tin Anodes: Bar, 1000 lb and over, $1.09; 500 to 999 lb, $1.095; 200 to 499 lb $1.10; less than 200 lb, $1.115. Freight allowed east of Mississippi and north of Ohio and Potomac. Based on 93-cent tin.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 94.9c; more than 2000 lb, 92.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers. Based on 93-cent tin.

Stannous Chloride (Anhydrous): In 400 lb bbl, $1.055; 100 lb kegs $1.08, f.o.b. Carteret, N.J., freight allowed on 100 lb or more. Based on 93-cent tin.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Scrap Metals

Brass Mill Allowances

(Prices in cents per pound for less than 20,000 pounds, f.o.b. shipping point; on lots over 20,000 pounds at one time of any or all kinds of scrap, add 1 cent per pound.)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	28.625	28.625	27.875
Yellow Brass	21.375	21.125	19.625
Commercial Bronze			
95%	27.250	27.000	26.500
90%	26.125	25.875	25.375
Red Brass			
85%	25.125	24.875	24.375
80%	24.125	23.875	23.375
Best Quality (71-80%)	22.500	22.250	21.750
Muntz metal	20.000	19.750	19.250
Nickel silver, 10%	25.250	25.000	12.625
Phos. Bronze, A	30.625	30.375	29.375
Naval Brass	20.000	19.750	19.250
Manganese Bronze	20.000	19.750	19.250

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 23.50-24.00; No. 2 copper 22.00; light copper 20.50; refinery brass (60% copper) per dry copper content 19.50-20.00.

INGOT MAKERS' COPPER AND BRASS SCRAP BUYING PRICES

(Cents per pound, carlots, delivered)

No. 1 copper 23.50 nom.; No. 2 copper, 22.00; light copper 20.50; No. 1 composition borings 17.50-18.00; No. 1 composition solids, 18.00-18.50; radiators 14.00-14.50; heavy yellow brass solids, 14.00-14.50; yellow brass turnings 13.50.

SMELTERS' BUYING PRICES FOR SCRAP ALUMINUM

(Carlots, delivered)

2S aluminum clippings, 16.00-17.50c; mixed clippings, 15.00-16.00c; old aluminum sheet, 14.00-14.25c; old aluminum cast, 14.00-14.25c; borings and turnings, 14.00-14.50c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 23.00; No. 2 copper 20.00; light copper 18.00; No. 1 composition red brass 17.00; No. 1 composition turnings 16.50; mixed brass turnings 10.00; new brass clippings 17.50; No. 1 brass rod turnings 16.00; light brass 10.00; heavy yellow brass 12.50; new brass rod ends 16.50; auto radiators, unsweated 13.00; cocks and faucets 15.00; brass pipe 16.00.

Aluminum: Clippings 2S 14.00; old sheets 10.00; crankcase 10.00; borings and turnings 7.50; pistons and struts 7.50.

Tin: No. 1 pewter 55.00; block tin pipe 80.00; No. 1 babbitt 45.00.

Lead: Heavy 10.50-11.00; battery plate 6.00-6.25; linotype and stereotype 12.75; electrotype 11.00; mixed babbitt 12.00-12.50.

Zinc: Old zinc, 4.50; new die cast scrap, 4.50; old die cast scrap, 3.50.

Nickel: Sheets and clips $1.00; rolled anodes $1.00; turnings 85.00c; rod ends $1.00.

Monel: Clippings 33.00; old sheet 30.00; turnings 25.00; rods 33.00.

DAILY PRICE RECORD

1953	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 8-9	29.75-30.00	13.30	11.00	83.00	20.50	34.50	60.00	85.25
July 7	29.75-30.00	13.30	11.00	82.75	20.50	34.50	60.00	85.25
July 6	29.75-30.00	13.30	11.00	84.75	20.50	34.50	60.00	85.25
July 3	29.75-30.00	13.30	11.00	87.00	20.50	34.50	60.00	85.25
July 2	29.75-30.00	13.30	11.00	88.00	20.50	34.50	60.00	85.25
July 1	29.75-30.00	13.30	11.00	89.50	20.50	34.50	60.00	85.25
June 29-30	29.75-30.00	13.30	11.00	90.50	20.50	34.50	60.00	85.25
June 26-27	29.75-30.00	13.30	11.00	91.25	20.50	34.50	60.00	85.25
June 25	29.75-30.00	13.30	11.00	91.75	20.50	34.50	60.00	85.25
June 24	29.75-30.00	13.30	11.00	93.00	20.50	34.50	60.00	85.25
June 23	29.75-30.00	13.30	11.00	93.875	20.50	34.50	60.00	85.25
June 22	29.75-30.00	13.30	11.00	93.50	20.50	34.50	60.00	85.25
June 19-20	29.75-30.00	13.30	11.00	92.75	20.50	34.50	60.00	85.25
June 17-18	29.75-30.00	13.30	11.00	92.00	20.50	34.50	60.00	85.25
June 16	29.75-30.00	13.30	11.00	92.50	20.50	34.50	60.00	85.25
June 15	29.75-30.00	13.30	11.00	93.00	20.50	34.50	60.00	85.25
June Avg.	29.875	13.213	11.00	92.913	20.50	34.50	60.00	85.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9% base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Nonferrous Metals

Precipitous decline in tin prices to new three-year lows has world-wide repercussions. U. S. offers to buy Bolivian metal and proposes additional aid

TIN PRICES continue to slump. From a high of $1.215 at the beginning of the year, Straits spot declined on the open market to an average of about 97 cents in May, 93 cents in June and is currently quoted at around 83 cents. Futures are quoted around 81 cents. The market is now at the lowest level since 1950.

Weakness in the market here reflects the price slump in Singapore and London. The precipitous plunge is having world-wide repercussions and is prompting action which may have an important bearing on market trends for months to come. In Malaya, nationalization of the industry is urged by trade unions. The subject of a tin agreement among world producers and consumers has been discussed abroad, but this movement is temporarily blocked by the opposition of the United States government.

U. S. Offers Aid—The Mutual Security Agency in Washington has recommended doubling its $1.5 million program of technical assistance to Bolivia to help Bolivia's agricultural development. The increased aid would help to reduce the country's industrial dependence on tin.

In order to assist the people of Bolivia "in the present difficult period," the Department of State has informed the Bolivian ambassador in Washington that the United States government is prepared to conclude a one-year contract for the purchase of Bolivian tin concentrates at the world market price at time of delivery.

Negotiations with Bolivia on the tin contract offer are expected to start soon. Bolivia has not indicated, however, whether the basis on which the contract is offered would be acceptable. For several years Bolivia has been seeking higher prices than the United States has been willing to pay on any long-term contract. Some time ago the United States government contracted for Indonesian tin at $1.20 a ton and offered Bolivia a contract on the same basis, but the Bolivians held out for a higher price.

The latest proposals were timed to coincide with the arrival in Bolivia of an American goodwill mission headed by Milton Eisenhower, brother of the President.

Seek Nationalization

MALAYA'S trade unions seek nationalization of the tin and rubber industries, reflecting the declining price trend.

The nationalization resolution was on the agenda for last week's meeting in Kuala Lumpur of the Malayan Trade Union council. The resolution says workers "view with grave concern the instability of tin and rubber prices and the consequent threat both to the economy of the country and the welfare of workers."

United States imports of tin metal that originates in Malaya account for 57 per cent of the total and amounted to 45,991 long tons in 1952.

Copper Wire Prices Cut

Phelps Dodge Copper Products Corp., New York, reduced its base prices for copper wire for less than carload quantities of the following levels, effective as of July 9:

Bare copper wire, 35.98c; weatherproof wire, 37.03c; magnet wire, 42.58c; square and rectangular bare copper wire, 39.23c.

The new price schedule represents reductions of 2.10 cents per pound on bare wire, magnet wire and the square and rectangular wire; 1.57 cents on weatherproof wire. Prices for carload lots and lots of 100,000 pounds or more are priced at the usual differentials.

This action establishes the firm's wire prices on the basis of 30.00c per pound for electrolytic copper as against the basis of 32.10c per pound previously in effect.

Aluminum Output Sets Record

Production of primary aluminum in the United States soared to an all-time high in May, reports Donald M. White, secretary, Aluminum Association, New York.

"With a total of 210,953,111 pounds, production for May exceeded the previous record set in March of this year by about 2 million pounds and was 31 per cent over the 161,607,096 pounds produced in May, 1952," he says. Total production for April, 1953, was 204,142,768 pounds.

Shipments of aluminum sheet and plate by member companies of the association totaled 122,756,743 pounds in May. This represented a drop of almost 6 million pounds from the April figure but an increase of more than 37 million pounds from the May, 1952, total.

Member companies shipped 9,541,916 pounds of foil compared with 9,227,679 pounds for April and 6,216,916 pounds for May, 1952.

May shipments of permanent mold and semipermanent mold rough castings (except pistons) by members totaled 3,128,449 pounds during May compared with 3,822,640 pounds in April and 2,550,227 pounds in May of last year.

Will Boost Lead-Zinc Output

Large scale production of lead and zinc will be resumed at the properties of Chief Consolidated Mining Co., Salt Lake City, Utah, in the Tintic mining district in that state. This is provided under terms of a contract between the company and Defense Materials Procurement Agency, Washington. The development program, which is in part an extension of an exploration contract between the company and Defense Minerals Exploration Administration, will extend over a period of three years.

Chief Consolidated plans to develop deposits containing an estimated 487,000 tons of ore. The estimated cost of the project is $1,416,865, of which DMPA will advance up to a maximum of $383,373.

Nonferrous Briefs

- Russia is attempting to sell platinum in London for the first time in six years, offering 3000 oz at about $90 an oz. If resumed at their former rate, Soviet offerings could affect the platinum market strongly. In 1947, the last year Russian platinum was exported in volume, the United States took 32,667 oz of it. Consumption in this country averages about 17,500 oz monthly.

- Average number of pounds of aluminum used per plane in 1929 was 1548. Consumption increased steadily and became phenomenal in World War II when the B-29 Superfortress, for example, used 50,000 pounds. The problem now is to find alloys which will surmount the heat barrier encountered by jet engines.

Moly is now free

The U. S. Government has just freed molybdenum from all domestic controls. For the first time in 2½ years American industry can get all it needs.

A spectacular increase in production capacity at our mine at Climax, Colorado, has made this possible. This mine, one of the largest underground operations in the world, is the major producer of molybdenum.

Our rate of production is now nearly 70% higher than it was only a year ago. A further expansion within the next twelve months will raise the 1952 level another 20%.

This expansion will enable us to satisfy more than adequately the foreseeable demands of both National Defense and our customers in the iron, steel, automotive, oil, chemical, electronics, and aircraft industries.

We thank all those who have waited so patiently for this moment.

Climax Molybdenum Company

500 Fifth Avenue · New York 36, N.Y.

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 165. Key to footnotes, page 167.

—SEMIFINISHED—

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 ..... 62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.50
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....81.00
Gary,Ind U5 .....62.00
Johnstown,Pa. B2 .....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 ....75.50
Buffalo R2 .....75.50
Canton,O. R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..82.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 ....75.50
Fontana,Calif. K1 ....94.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....85.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2 ..75.50
LosAngeles B3 .....94.50
Munhall,Pa. U5 .....75.50
Seattle B3 .....94.50
So.Chicago R2,U5,W14 75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ..94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. P2 .....82.00
Canton,O. T7 .....84.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....85.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....92.00
Ind.Harbor,Ind. Y1 ..82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14 .82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O Y1 .....82.00
Warren,O. C17 .....76.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$87.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R3 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ...3.75

WIRE RODS
Alton,Ill. L1 .....4.70
AlabamaCity,Ala. R2..4.525
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Johnstown,Pa. B2 ....4.525
Houston S5 .....4.925
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ...4.865
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.575
Monessen,Pa. P7 ....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ...5.175
Portsmouth,O. P12 ....4.725
Roebling,N.J. R5 ....4.425
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2 4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Bethlehem,Pa. B2 ....4.15
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.80
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.30
Munhall,Pa. U5 .....4.10
Niles,Calif.(22) P1 .....4.91
Phoenixville,Pa. P4 ...4.95
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ...4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 .....5.30
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 .....6.175
Bethlehem,Pa. B2 .....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 .....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ....6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

—PILING—

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 .4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

—PLATES—

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.55
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 .....4.35
Conshohocken,Pa. A3 ..4.55
Ecorse,Mich. G5 .....4.65
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1..4.75
Gary,Ind. U5 .....4.10
GraniteCity,Ill. G4 ....4.60
Geneva,Utah C11 .....4.10
Harrisburg,Pa. C5 .....6.50
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ...4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.40
Youngstown R2, U5, Y1 4.10

PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
(Add 4.7% to base, extras)
Economy,Pa. B14 .....8.60

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland R2 .....5.95
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.50
Ecorse,Mich. G5 .....7.10
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ....6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2..6.25
Warren,O. R2 .....5.95
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.65
Coatesville,Pa. L7 .....5.75
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5, W14 5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ..5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..4.35
Ashland,l.c.l. (15) A10. 4.85
Cleveland,c.l. 4.70
Warren,O. c.l. R2 ....4.70

—BARS—

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..4.15
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.45
Bessemer,Ala. T2 .....4.15
Buffalo R2 .....4.15
Clairton,Pa. U5 .....4.15
Cleveland R2 .....4.15
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.50
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.40
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y.B11 ..4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 ....4.90
Seattle B3, N14 .....4.90
So.Chicago R2, U5, W14 4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3...4.90
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5 ....4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. T7 .....5.02
Canton,O. R2 .....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....5.025
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.345
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.575
Lackawanna,N.Y. B2..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.675
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.225
Bessemer,Ala. T2 ....6.225
Bethlehem,Pa. B2 .....6.225
Clairton,Pa. U5 .....6.225
Cleveland R2 .....5.925
Ecorse,Mich. G5 .....6.875
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. I-2, Y1 6.225
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2 ....6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ..6.225
So.SanFrancisco B3 ...6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES,H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.45
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.00
Gary,Ind. U5 .....5.00
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 .....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....4.925
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 ....4.925
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.20
LosAngeles R2 .....6.65
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ...5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.70
NewCastle,Pa. B4 .....5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.85
Readville,Mass. C14 ...5.475
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 ....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 .....6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2 .....6.325
Canton,O. T7 .....6.29
Carnegie,Pa. C12 .....6.00
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit P17, R7 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.00
Gary,Ind. R2 .....6.325
Hammond,Ind. L2, M13 6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8...6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.60
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.475
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.00
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ...6.625
Youngstown F3, Y1 ..6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 .....4.45
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. B6 .....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 .....4.90
So.Chicago,Ill. R2 .....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2..4.15
Sterling,Ill. (1) N15 ..4.90
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ½-1" B2 .....5.55
KansasCity S5 .....6.35
LosAngeles B3 .....6.18
Marion,O P11 .....5.25
Seattle B3, N14 .....5.80
Sand Springs S5 .....6.45
So.SanFrancisco B3 .....6.25
SparrowsPt. ½-1" B2 .....5.55
Williamsport,Pa. S19 ...5.35

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.50
Franklin,Pa.(3,4) F5 ...4.75
FortWorth,Tex.(26) T4..4.85
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....4.05
Tonawanda(3,4) B12 ..5.00
Williamsport(3) S19 ...5.25
Williamsport,Pa. S19 ...5.35

BARS, Wrought Iron
Economy,Pa.(S.R.) B14 9.60
Economy,Pa.(D.R.)B14 11.90
Economy(Staybolt) B14 12.20
Mck.Rks.(Staybolt) L5 15.50
Mck Rks.(S.R.) L5 ...10.40
McK.Rks.(D.R.) L5 ..14.00

—SHEETS—

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 .3.925
Ashland,Ky.(8) A10 ...3.925
Butler,Pa. A10 .....3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.125
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....4.025
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 3.925
Irvin,Pa. U5 .....3.925
Lackawanna,N.Y. B2..3.925
Munhall,Pa. U5 .....3.925
Niles,O. N12 .....5.425
Pittsburg,Calif. C11 ....4.625
Pittsburgh J5 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ....3.925
SparrowsPoint,Md. B2..3.925

Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ..4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
WestLeechburg,Pa. A4 3.925
Youngstown U5, Y1 ...3.925

SHEETS, H.R. (19 gage)

AlabamaCity,Ala. R2 ..5.125
Dover,O. R1 .....5.825
Mansfield,O. E6 .....5.80
Niles,O. N12 .....5.675
Torrance,Calif. C11 ....5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....5.90
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....5.90
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ...5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 ....5.90
SparrowsPoint(38) B2 ..5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....6.175
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....4.775
Ecorse,Mich. G5 .....4.975
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 4.875
Follansbee,W.Va. F4 ..5.775
Fontana,Calif. K1 ....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....5.275
Ind.Harbor,Ind. I-2, Y1 4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ..5.725
Pittsburgh J5 .....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ..4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ...4.775
We tLeechburg,Pa. A4..5.45
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.675
Fontana,Calif. K1 .....8.275
Gary Ind U5 .....7.225
IndianaHarbor,Ind. Y1 .7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ....7.225
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2 7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ...7.475
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 .5.275
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....5.275
Dover,O. R1 .....5.475
Fairfield,Ala. T2 ....5.275
Gary,Ind. U5 .....5.275
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.325
Irvin,Pa. U5 .....5.275
Kokomo,Ind. C16 .....5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....6.275
Pittsburg,Calif. C11 ..6.025
SparrowsPoint,Md. B2 5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..6.025
Weirton,W.Va. W6 ....5.275

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A1	.6.325	....
Canton,O. R2	...6.475	6.925
Fairfield(41)	T2..6.075	6.325
Gary,Ind. U5	..6.075	6.325
Ind.Harbor I-2	.6.075	6.325
Irvin,Pa.(41)	U5..6.075	6.325
Kokomo,Ind. C16	**6.525**	....
Martinsferry,O.W106.075		....
Pitts. Cal C11(41)	6.825	....
SparrowsPt. B2	.6.075	....
Torrance,Calif.C11	6.625	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	.....6.575
Fairfield,Ala.(41)	T2...6.325
MartinsFerry,O. W10	..6.325

SHEETS, Galvanneale Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825
Kokomo,Ind(13) C16 ..5.925
Niles,O. N12 .....6.825

SHEETS ZINCGRIP STEEL

Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electro Galvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.775

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.175
Cleveland R2 .....5.175
Gary,Ind U5 .....5.175
GraniteCity,Ill. G4 ...5.875
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Youngstown Y1 .....5.175

BLUED Stock, 29 ga.

Yorkville,O W10 .....7.20
Follansbee,W.Va. F4 ...7.30
Follansbee (23) F4 ...7.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....5.675
Niles,O. N12 .....**6.275**
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.075

SHEETS, Well Casing

Fontana,Calif. K1 ....5.34

—STRIP—

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(28) R2 ..3.925
Alton,Ill. L1 .....4.20
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.475
Bessemer,Ala. T2 ....3.925
Bridgeport,Con.(10)S15 4.425
Buffalo (27) R2 .....3.925
Butler,Pa. A10 .....3.92
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.325
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.225
Fairfield,Ala. T2 ....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.92
Houston,Tex. S5 .....4.425
Ind Harbor Ind I-2 ...3.92
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5..4.625
Lackawna,N.Y.(32) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. B6 .....4.35
Minnequa,Colo C10 ....4.775
NewBritain(10) S15 ...4.425
N Tonawanda,N.Y. B11.3.925
Pittsburg,Calif. C11 ..4.675
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25) B3.4.675
SparrowsPoint,Md. B2 .3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....4.025
WestLeechburg,Pa. A4.3.975
Youngstown Y1, U5 ...3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.45
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.90
KansasCity,Mo. S5 .....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.45
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....5.65
Conshohocken,Pa. A3 ..6.20
Ecorse,Mich. G5 .....6.50
Fairfield,Ala. T2 .....5.65
Fontana,Calif. K1 ....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.40
Seattle(25) B3 .....6.65
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6.....6.30
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(2) A10 ...4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 ..5.80
Bridgeprt,Conn.(10) S15..6.15
Bulter,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....6.05
Detroit D2 .....5.95
Detroit M1 .....5.45
Dover,O.(40) G6 .....5.80
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill.(40 T6.5.70
Ind.Harbor,Ind. I-2 ...5.70
Lackawanna,N.Y. B2 ...5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 .....5.45
NewBritain(10) S15 ....6.15
NewCastle Pa.(14) B4 ...5.45
NewCastle,Pa. E5 .....5.95
NewHaven,Conn. A7 ...5.95
NewHaven,Conn. D2 ...6.20
Pawtucket,R.I. R3 ....6.45
Pawtucket,R.I.(21) N8..6.65
Riverdale,Ill. (40) A1 ..5.70
Rome,N.Y.(29) R6 .....5.45
Sharon,Pa. S3 .....5.80
SparrowsPoint,Md. B2 ..5.45
TrentonN.J. R5 .....6.45
Wall'ford,Conn. W2(50) 6.40
Warren,O.(40) T5 .....5.70
Warren,O R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. W19 .....7.05
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
NewBritn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dover,O. G6 .....**8.00**
Ecorse,Mich. G5 .....8.50
Lackawanna,N.Y. B2 8.15
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. 8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.30
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electro Galvanized

Dover,O. G6 .....5.70
Warren,O. T5 .....**5.70**
Weirton,W.Va. W6 ....5.10
Youngstown C8 .....5.95

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.55
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur D. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Co.

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lake Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwst. Steel Roll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I.Div.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div.,Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel Co.

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	...
Carnegie,Pa. S18	...	8.00	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	6.05	8.25	8.85	....	....
Detroit D2	6.45	7.85	8.45	10.55	....
Dover,O. G6	6.05	8.00	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	....
Harrison,N.J. C18	....	....	*8.90*	*10.85*	*13.15*
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
NewCastle,Pa. B4	5.80	8.00	8.60	....	....
NewCastle,Pa. E5	5.95	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	6.70	7.95	8.55	10.50	....
NewYork W3	...	8.30	8.90	10.85	13.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	....	8.00	8.60	10.55	12.85
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.80	8.00	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.55	10.50	12.80
Wallingford,Conn. W2	*6.65*	*7.95*	*8.90*	*10.85*	*13.15*
Warren,O. T5	6.20	7.65	8.25	10.20	12.50
Weirton,W.Va. W6	5.80	8.00	8.60	10.55	12.85
Worcester,Mass. A7	5.75	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	11.875	14.075	16.925
Harrison,N.J. C18	....	....	*12.50*	*15.00*	*18.00*
New York W3	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Youngstown C8	...	...	10.30	12.50	15.35

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	8.35	9.60	10.40
Brackenridge,Pa. A4	...	...	8.35	9.60	10.40
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(34)	...
Mansfield,O. E6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)	...	7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.05	7.35	7.85	...	...
Vandergrift,Pa. U5	...	8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10	...	8.35	8.85	10.10	10.90

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	10.95	....	....	....
Newport,Ky. N9 (cut lengths)	10.95	....	....	....
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45	....	....	....
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	16.05	16.55
Vandergrift,Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	*7.50*	*7.75*	*8.15*
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	...	...
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	*8.80*	*9.05*
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	....
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	*6.60*
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.55

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Atlanta A11	5.775
Alton,Ill. L1	5.75
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20	5.525
Crawfordsville,Ind. MS	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	*6.02*
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.475
Monessen,Pa. P7	5.475
Newark 6-8 ga I-1	5.88
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.725
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Torrance,Calif. C11	6.475
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.15
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2	6.925
Millbury (12) N6 (43) 8.725	
Minnequa,Colo. C10(43)	6.50
Monessen,Pa. P7 (43)	6.25
Monessen,Pa. P16	6.95
Muncie,Ind. I-7 (43)	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Roebling,N.J. R5	6.85
Portsmouth,O. P12	6.925
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester, T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.85
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.525
Monessen,Pa. P7	6.275
Monessen,Pa. P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.575
So.Chicago,Ill. R2	6.275
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Torrance,Calif. C11	7.575
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8"Coils)	
Alton,Ill. L1	10.15
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.05
Cleveland (42) A7	10.55
Crawf'sville,Ind. MS	10.55
Fostoria,O. S1	*10.55*
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.35
So.SanFrancisco C10	10.90
Waukegan,Ill.(42) A7	10.55
Worcester,Mass.(42) A7	10.85
Worcester,Mass. T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7 (43)	9.70
Roebling,N.J. R5	9.30
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	*9.35*
Johnstown,Pa. B2	9.35
Monessen,Pa. P16	9.35
Monessen,Pa. P7 (43)	**8.80**
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.25
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.00
Roebling,N.J. R5	12.30

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawf'sville,Ind.MS(4)	7.55
Dover,O. G6	7.45
Fostoria,O. S1 (43)	6.00
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	6.95
Monessen,Pa. P16	6.95
Monessen,Pa. P7 (43)	6.10
Pawtkt.R.I.(12) N8	7.75
Trenton,N.J. R5 (43)	7.25
Worcester,Mass. A7	7.75
Worcester,Mass. T6	7.75
Worcester,Mass. W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld.	Galv.
AlabamaCity R2	6.675	7.075
Aliquippa J5	6.075	6.525‡
Atlanta A11	6.925	7.475
Bartonville(19)K4	6.675	7.225
Buffalo W12	6.675	7.075
Cleveland A7	6.675	....
CrawfordsvilleMS	6.775	7.325
Donora,Pa. A7	6.675	7.075
Duluth,Minn. A7	6.675	7.075
Fairfield T2	6.675	7.075
Houston,Tex. S5	7.075	7.475
Johnstown B2(48)	6.675	7.225
Joliet,Ill A7	6.675	7.075
KansasCity,Mo.85	7.275	7.675
Kokomo C16	6.775	7.175
LosAngeles B3	7.625	....
Minnequa C10	6.325	6.70*
Monessen P7	6.075	6.45
Palmer W12	6.975	7.375
Pitts.,Calif. C11	7.625	8.025‡
Prtsmth.(18)P12	6.575	....
Rankin A7	6.675	7.075
So.Chicago R2	6.075	6.325
So.S.Frn.(48)C10	7.625	8.025‡
Spar'wsPt. B2(48)	6.775	7.325
Sterl'g(1)(48)N15	6.675	7.225
Struthers,O. Y1	6.675	7.175
Worcester A7	6.975	....

*Based on 14c zinc; †14.50c zinc; ‡17.5c zinc; §11c zinc.

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Aliquippa J5 (43)	10.15	12.15
Bartonville(19)K4	10.73	12.51
Cleveland A7	12.50	....
CrawfordsvilleMS	12.50	14.35
Fostoria,O. S1	*12.60*	*14.15*
Johnstown B2	*12.50*	*14.35*
Kokomo C16	12.60†	14.15§
Min'qua C10(43)	10.40	12.425*
Palmer,Mass.W12	12.50	14.05
Pitts.,Calif. C11	12.85	14.40
SparrowsPt. B2	*12.60*	*14.45*
Sterling(1) N15	10.73	12.15
Waukegan A7	12.50	14.05
Worcester A7	12.80	....

*Based on 14c zinc; §14.50c zinc.

WOVEN FENCE, 9-15½ Ga. Col.	
AlabamaCity,Ala. R2	140
Ala.City,Ala.,17-18ga.R2	222
Aliqu'pa,Pa.9-14½ga.J5	139‡
Atlanta A11	146
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17ga.,6" B2	234
Johnstown, 4"	237
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146*
Monessen,Pa. P7	138
Pittsburg,Calif. C11	163
Rankin,Pa. A7	140
So.Chicago,Ill. R2	140
Sterling,Ill. (1) N15	143

*On 14c zinc; ‡17.5c zinc.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	152
Bartonville,Ill.(19) K4	149
Crawfordsville,Ind. MS	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	137
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	153
Aliquippa,Pa. J5	148‡
Atlanta A11	159
Bartonville,Ind.(19) K4	156
Crawfordsville,Ind. MS	159
Donora,Pa. A7	153
Duluth,Minn A7	153
Fairfield,Ala. T2	153
Houston,Tex. S5	161
Johnstown,Pa. B2	156
Joliet,Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	153*
Monessen,Pa. P7	147
Pittsburg,Calif. C11	173
Rankin,Pa. A7	153
Co.Chicago,Ill. R2	153
SparrowsPoint,Md. B2	158
Sterling,Ill.(1) N15	156

*On 14c zinc; ‡17.5c zinc.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa J5	127
Atlanta A11	134
Bartonville,Ill. (19) K4	131
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. MS	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	*139*
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet, Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10(44)	123
Monessen,Pa. P7	127
Pittsburg,Calif C11	150
Portsmouth,O. P12	132
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, Cut (100 lb keg) to dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	126
Atlanta A11	136
Bartonville,Ill. (19) K4	*133*
Bartonville,Ill. (19) K4	133
Crawfordsville,Ind. MS	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10 (45)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11	152
Portsmouth,O. P12	132
Rankin,Pa. A7	133
So.Chicago,Ill. R2	131
SparrowsPt.Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	143
Franklin,Pa. F5	145
Johnstown,Pa. B2	148
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	18.25	...	22.25	...	24.75	...	26.25	...	26.25	...	26.00	...	28.50	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	24.75	9.5	23.75	9.50	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.50	22.25	5.00	23.75	6.50	23.75	6.50	23.00	5.75	25.50	8.25

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown R2 (††)	15.75	list	19.75	2.5	22.25	5.0	23.75	6.5	23.75	6.5	23.0	5.75	25.5	8.25

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft.	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft.	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv.	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv.
Aliquippa, Pa. J5 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill., L1 (††)	....	....	....	....	....	....	23.25	7	26.25	11	28.75	14.5	31.25	15.5	31.75	16.5
Benwood, W.Va. W10(††)	25.5	+0.75	17.75	+6	10.25+10.75		26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5	+13	....	....	....	....	....	....	....	....	....	....
Etna, Pa. N2 (†)	28	+1.25	22	+4.75	16	+9.5	28.75	9.5	31.75	13.5	34.25	17	36.75	18.75	37.25	19.75
Fontana, Calif. K1 (††)	....	....	....	....	....	....	13.25	+2	16.25	1	19.25	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	....	....	....	....	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	....	....	....	....	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (†)	28	+1.75	22	+1.75	16	+5	....	....	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Sparrows Pt., Md. B2	28.5	+0.75	23	+3.75	18	+7.5	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5
Youngstown R2 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Youngstown Y1 (††)	....	....	....	....	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9	28.5	+0.75	23	+3.75	18	+7.5	32.5	13.25	35.5	16.25	38	18.75	38.5	19	39	19.5

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft.	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill. L1 (††)	32.25	17	33.75	17	33.75	17	....	....	....	....
Benwood, W.Va. W10(††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Etna, Pa. N2 (†)	37.75	20.25	39.25	21	39.25	21	30.25	11.5	30.25	11.5
Fontana, Calif. K1 (††)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20	36.75	20	36.75	20	....	....	....	....
Sparrows Pt., Md. B2	37.5	20	38	19.75	38	19.75	27.75	10.5	27.75	10.5
Youngstown R2 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Youngstown Y1 (††)	35.25	20.00	36.75	20.00	36.75	20.00	....	....	....	....
Wheatland, Pa. W9	39.5	20	40	20.25	40	20.25	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 12.50c; (*), 5c; (††), 10.50c-11.50c; with discounts adjusted depending on price of zinc at time of shipment.

BOILER TUBES

Net base c.i. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft., inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	14.80	18.05–18.96	....	....
1¼	13	17.53	21.38–22.45	16.93	....
1½	13	19.37–20.34	23.63–24.81	18.16	....
1¾	13	22.89–24.72	27.92–30.16	20.28	....
2	13	25.65–27.71	31.29–33.81	22.73	....
2¼	13	28.89–31.20	35.24–38.06	25.62	....
2¼	12	31.36–33.87	38.25–41.32	28.31	....
2½	12	34.54–37.31	42.14–45.52	31.19	....
2¾	12	37.40–40.39	45.62–49.28	33.77	....
3	12	39.89–43.08	48.65–52.56	35.76	....

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	60 lb Under
RAILS				
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	....
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	....
Johnstown,Pa. B2				*(16)5.20*
Lackawanna,N.Y. B2	*4.325*	*4.225*		*5.20*
Minnequa,Colo. C10	4.075	3.975	....	5.05
Steelton,Pa. B2	4.325	4.225	....	....
Williamsport,Pa. S19	....	....	....	5.00
TIE PLATES				
Fairfield,Ala. T2	....5.125			
Gary,Ind. U5	.....5.125			
Ind.Harbor,Ind. I-2	..5.125			
Lackawanna,N.Y. B2	..5.125			
Minnequa,Colo.C10	...4.925			
Pittsburg,Calif. C11	..5.275			
Seattle B3	.....5.275			
Steelton,Pa. B2	.....5.125			
Torrance,Calif. C11	....5.275			
STANDARD TRACK SPIKES				
Ind.Harbor,Ind. I-2, Y1	7.05			
KansasCity,Mo. S5	.....7.30			
Lebanon,Pa. B2	.....7.05			
Minnequa,Colo. C10	....6.80			
Pittsburgh J5	.....6.65			
Seattle B3	.....7.55			
So.Chicago,Ill. R2	.....7.05			
Struthers,O. Y1	.....7.05			
Youngstown R2	.....7.05			
JOINT BARS				
Bessemer,Pa. U5	....5.275			
Fairfield,Ala. T2	.....5.275			
Ind.Harbor,Ind. I-2	..5.275			
Joliet,Ill. U5	.....5.275			
Lackawanna,N.Y. B2	..5.275			
Minnequa,Colo. C10	..5.075			
Steelton,Pa. B2	.....5.275			
STRIP, Hot-Rolled Ingot Iron				
Ashland,Ky.(2) A10	..4.175			
Warren,O. R2	.....4.525			
TRACK BOLTS (20) Treated				
KansasCity,Mo. S5	....11.00			
Lebanon,Pa. (31) B2	*10.75*			
Minnequa,Colo. C10	....9.85			
Pittsburgh P14	.....11.00			
Pittsburgh O3	*11.00*			
AXLES				
Ind.Harbor,Ind. S13	...6.50			
Johnstown,Pa. B2	.....6.50			

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	Light
½-in. & smaller diam.	*4*
⅝-in. & ⅝-in.	*5*
¾-in. and larger	*3*
Longer than 6 in.:	
All diams.	*+4*
Lag bolts, all diams.:	
6 in. and shorter	*12*
over 6 in. long	*8*
Ribbed Necked Carriage	*5*
Blank	*25*
Plow	*25*
Step, Elevator, Tap and Sleigh Shoe	*12*
Tire Bolts	*List*
Boiler & Fitting-Up Bolts	*23*

NUTS

H P & C P	Reg. Hvy.
Square:	
½-in. & smaller	*+2 2*
⅝-in. & ⅝-in.	*+7 +32*
¾-in.-1⅛-in.	*+8 +27*
1⅛-in. & larger	*+9 +27*
H.P. Hex.:	
½-in. & smaller	*11 8*
⅝-in. & ⅝-in.	*2 +20*
¾-in.-1⅛-in.	*+6 +25*
1⅛-in. & larger	*+8 +25*
C.P. Hex.:	
½-in. & smaller	*11 8*
⅝-in. & ⅝-in.	*9 +2*
¾-in. & 1⅛-in.	*+1 +9*
1⅛-in. & larger	*+16 +20*

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	*21*	*14*
⅝-in. & ⅝-in.	*18*	*4*
¾-in.-1⅛-in.	*8*	*+8*
1⅛-in. & larger	*+14*	*+20*

	Light
⅞-in. & smaller	33
1-in. to ⅝-in.	26
⅝-in. to 1⅛-in.	18

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	*34*
1 in. and smaller diam. x over 6 in.	*20*

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼-in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5 & 10
Plated finishes	30 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	*18*
¾-in. through 1 in.	*22*
Longer than 6 in.:	
⅝-in. and smaller	*20*
¾-in. through 1 in.	*7*

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+ % Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. N.Y., c.l., in bags	10.90
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+ % Fe)	36.50
Unannealed (99+ % Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns,	$3.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	34.00
Antimony, 500 lb lots	78.00
Brass, 20-ton lots	30.00-39.00
Bronze, 10-ton lots	52.25-60.00
Copper:	
Electrolytic	43.50
Reduced	43.50
Lead	21.75
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	48.50
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	87.00
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic 99.9% Cr min.	3.50

* plus cost of metal.

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh; f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger	*8.90c*
⅜-in. under	*26.5 off*

Footnotes

(1) Chicago base.
(2) ..ngles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(15) ½" and thinner.
(16) 40 lb and under
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Add $1.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.85c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.025"; 0.025" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.75% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 40c per 100 lb.
(46) Plus 2.2 per cent.
(48) 6.7 gage.
(49) U post; add 2 cols. for T post.
(50) 0.025 gage; 6.55c for 0.026 to 0.068 gage; 6.65c for 0.069 gage and over.

STAINLESS STEEL MILL PRICES

(Cents per pound; subject to current lists of extras and standard sale conditions)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Shapes; H.R. & C.F. Bars, & Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	....	34.25	29.75	35.25	....	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B ...	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
305	19.50	25.50	....	36.25	37.00	37.50	....	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S ...	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
317	33.00	43.50	56.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F ...	....	18.75	25.00	28.75	....	29.75	....	....	....
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A ...	....	28.50	29.25	34.00	....	35.00	....	....	....
440B ...	....	28.50	29.25	34.00	....	35.00	....	....	....
440C ...	....	....	29.25	34.00	....	35.00	....	....	....
446	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Division, U. S. Steel Corp.; Armco Steel Corp.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur D. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Co.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Division, Borg Warner Corp.; Jessop Steel Co.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; Page Steel & Wire Division, American Chain & Cable Co. Inc.; Republic Steel Corp.; Rome Mfg. Co.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Stainless Welded Products Inc.; Superior Steel Corp.; Timken Roller Bearing Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

(Cents per pound; add 4.7% to base price and extras)

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 10%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	....	19.75	26.24-27.50	77.00
304	25.00	29.50	24.50	27.50-27.77	77.00
309	30.50	35.00	....	.....	....
310	36.50	41.00	....	.....	144.00
316	29.50	34.00	26.00	35.92-36.50	....
317	34.50	39.00	....	.....	....
318	33.50	38.00	....	.....	....
321	26.50	31.00-32.00	23.00	33.00	111.00
347	27.50	32.00	24.00	33.50-33.83	130.00
405	21.25	27.75	....	.....	....
410	20.75	27.25	....	.....	....
Nickel .	33.55	45.15	....	.....	....
Inconel .	41.23	54.18	....	.....	165.00
Monel .	34.93	46.28	....	.....	....
Copper* .	....	....	....	44.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Nickel	41.00	54.00	....	....
Copper*	27.85†	35.85†	24.00†	32.25†

* Deoxidized. Production points: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.
† Includes 4.7% on base and extras.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb	Grade	$ per lb
Regular Carbon ...	0.230	Oil Hardening	0.350
Extra Carbon	0.270	5% Cr. Hot Work	0.350
Special Carbon	0.325	Hi-Carbon-Cr	0.635

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20	4.25	1.6	12.25	....	3.535-3.675
19	4	2	7	....	2.460
18.25	4.25	1	4.75	....	2.125
18	4	2	9	....	2.445-2.450
18	4	2	....	....	1.650-1.660
18	4	1	....	....	1.505
13.5	4	3	....	....	1.6025
9	3.25	0.5	....	....	1.010
6.4	4.5	1.9	....	5	0.960-0.965
6	4	3	....	6	1.190
1.5	4	1	....	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Tool Steel Shipments Decline Slightly

Further slump expected to be shown for June and July due to vacations and other seasonal influences. Total movement to date in 1953 off from like 1952 period

New York — Shipments of high speed and tool steel, exclusive of hollow drill steel, during May totaled 10,863 net tons, according to the American Iron & Steel Institute.

While this was a decline of 662 tons from April shipments of 11,525 tons, it was 576 tons greater than shipments of 10,287 reported for May a year ago.

Cumulative shipments to the end of May this year at 52,985 net tons, however, were off 9,677 compared with shipments of 62,662 tons in the like period of 1952.

Slight decline in shipments during May from April is believed to reflect slackening in demand attending the approach of the vacation season. Sellers anticipate an even more noticeable slump to be shown by June and July data, these two months marking the peak of vacation suspensions.

While total movement of tool steel to date this year has been off somewhat from a year ago sellers' experience has not been uniform. Some of them report their sales volume this year is substantially larger than in 1952. They explain this by sustained heavy demands from the automotive and related industries.

Recently tool steel prices were advanced in line with changes effected generally in the steel market. New base prices and extras represent increases of 5 per cent to the nearest ½ cent except for high speed drill rod which is to the nearest 1 cent. All extras under 5 cents have been increased ½ cent except warehouse, annealing and packaging which held unchanged. The new prices became effective late in June.

COMPARATIVE FIGURES ON TOOL STEEL SHIPMENTS

	(Net Tons) May 1953	April 1953	Year To Date 1953	1952
Class A high speed	2,040	2,211	9,872	9,865
Class B high speed	313	252	1,384	1,181
Other tool steels	8,510	9,062	41,729	51,616
Total	10,863	11,525	52,985	62,662

Fastener Prices Advanced

Cleveland — Industrial fastener manufacturers generally have issued new discount lists reflecting price increases averaging about 10 per cent, though revisions vary from item to item depending upon the specific cost factors ruling for each.

Beginning about June 25 announcements have been coming from the manufacturers on varying dates but the entire industry now appears to be on the higher level.

The increases reflect not only recent hikes in steel costs resulting from advances in mill extras and base prices, but also labor and other cost rises experienced over recent months.

Demand for bolts, nuts and rivets is holding up exceptionally well for the season although some soft spots are reported in the market. Automotive business is unusually strong and as yet shows no sign of slackening. In rivets, producers report demands from the railroad car builders are off noticeably, but volume from other consuming areas has been fluctuating.

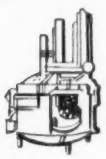
CONTROL is the key

to the unequalled performance of

WHEELABRATOR® STEEL SHOT

THESE CHECK POINTS GUARANTEE THE PERFORMANCE OF WHEELABRATOR® STEEL SHOT

MELTING

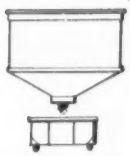


- 1. Rigid scrap selection.
- 2. Preliminary carbon and manganese analysis.
- 3. Complete chemical analysis.

POURING

- 4. Accurate and continuous control of pouring temperature.
- 5. Accurate and continuous control of quench temperature.

FIRST SCREENING

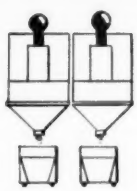


- 6. Visual and metallographic inspection in as-cast condition.
- 7. Hardness check in as-cast condition.
- 8. Continuous inspection of screening operation.

DRYING and SHOT CONDITIONING

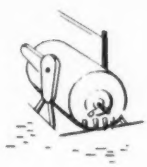
- 9. Recording temperature control.
- 10. Removal of objectionable material.

SECOND SCREENING



- 11. Continuous inspection of screens.

FIRST HEAT TREATING

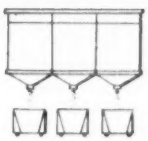


- 12. Automatic control and permanent record by recording instrument of heat treat time and temperature.

SECOND HEAT TREATING

- 13. Automatic control and permanent record by recording instrument of heat treat time and temperature.
- 14. Continuous tests for hardness and carbon content.
- 15. Continuous microscopic inspection.

FINAL SCREENING



- 16. Continuous inspection of screens and shot.
- 17. Daily laboratory checks of screening accuracy.

BAGGING

- 18. Continuous inspection of shot.
- 19. Daily shot breakdown tests.

How many perfect castings do you make in a hundred million pieces? One average shipment of shot, either iron or steel, contains that many individual castings. The greater percentage of imperfect castings it contains, the faster it breaks down and requires replacement. Even slight variations in structure or hardness can have a tremendous effect on cleaning costs.

After years of research, Wheelabrator has developed and patented a method for producing shot with an absolute minimum of defective pellets. It took a new plant and new production methods in order to achieve this quality and there are 19 CONTROL CHECKS to see that it is maintained.

This new "Wheelabrator" Steel Shot is made of the finest electric furnace steel which is heat treated to a tempered Martensite microstructure, the hardest and toughest of the iron carbon alloys. It is given a double heat treatment at automatically controlled temperatures to provide a new standard of toughness, solidity, uniformity and efficiency.

FOR YOU this means less abrasive to buy, fewer machine parts to replace, less maintenance labor required and lower freight costs.

Bulletin 89 tells the complete story about "Wheelabrator" Steel Shot and what it means to the user in terms of performance and economy. Write for your copy today.

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka, Indiana

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, San Francisco, St. Paul, 15 cents.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.64	7.81	7.00	...	6.86	7.92	12.04	6.98	6.85	7.98
Boston	6.89	7.83	9.23	7.13	...	6.87	8.10	12.10	7.06	7.18	8.26
Buffalo	5.95	6.85	8.71	6.47	...	6.05	7.15	11.85	6.20	6.38	7.67
Birmingham	6.10	7.00	8.00[3]	6.30	...	6.15	8.90	....	6.35	6.35	8.65
Charlotte, N. C.	6.75	7.55	8.49	6.70	...	6.80	8.09	....	6.80	6.85	...
Chicago	6.18	7.12	8.05	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.47	6.72	...	6.58	7.66	12.17	6.93	6.85	7.88
Cleveland	6.18	7.12	8.15	6.58	...	6.34	7.40	11.89	6.79	6.50	7.79
Detroit	6.22	7.02	8.04	6.39	6.85	6.27	7.32	11.57	6.54	6.55	7.52
Houston	6.89	...	8.62	7.16	...	7.13	...	....	6.94	6.86	8.24
JerseyCity,N.J.	6.54	7.45	8.72	6.82	...	6.75	7.90	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.25	9.85	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.2[2]	8.22	6.59	...	6.45	7.58	11.92	6.63	6.55	7.63
Moline, Ill.	6.31	7.1[1]	8.25	6.45	...	6.33	7.37	....	6.42	6.38	...
New York	6.54	7.45	8.72	6.82	...	6.75	7.90	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	9.02	7.16	...	7.06	7.90	....	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.53	7.55	8.35	7.02	8.80	6.87	7.94	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.60	6.55	...	6.28	7.40	11.75	6.46	6.33	7.46
Portland, Oreg.	7.80	9.05	9.30	7.50	...	7.25	9.40	....	7.25	7.05	9.25
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.35	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.47	7.48	8.56	6.77	...	6.64	7.78	....	6.73	6.69	7.92
San Francisco	7.35	8.70	9.90	7.60	...	7.15	9.85	13.05	7.25	7.20	9.25
Seattle-Tacoma	8.15	8.70	10.10	8.02	...	7.58	10.13	13.50	7.50	7.59	9.40
Spokane (city)	7.40	9.40	9.80	7.15	...	7.10	9.60	13.20	7.00	7.10	9.15
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [3]—500 to 9999 lb; [2]—1000 to 1999 lb.

Plant Vacations Cut Warehouse Volume

Distributors adjust July schedules on products in line with slower demand. Inventories improving but under normal and unbalanced. New prices firmly established

Cleveland—July warehouse order volume will be down from that of June largely for the reason demand has slumped in company with the suspension or curtailment of manufacturing operations in many plants to permit mass vacations. There is no indication that this is more than a temporary letup in ordering.

Consumers depending on warehouse stocks as their supply source have accepted the recent price increases without much resistance, indicating continued strong need for steel.

Distributors' stocks are improving but they are still considerably under normal and are highly unbalanced with respect to sizes.

Galvanized sheets, reportedly, are available promptly from warehouse, but a prominent producing mill last week was in receipt of a hurry call from a leading Cleveland district warehouse for a substantial tonnage of galvanized.

New York—Warehouse volume is off because of plant closings. On numerous products distributors adjusted July purchase schedules in line with this lower demand, exceptions being structurals.

Alloy bars, stainless products and most specialties now balance demand with inventories heavier. Cold-finished carbon bars, one and one-half inch and heavier, are still in limited supply. Hot-rolled carbon bar stocks are building up in wider range of sizes.

Alloy replacements are more prompt, but mills have not reduced lead times.

Chicago—Warehouses report good demand for steel still prevails. However, during this month and next some dip is expected because many manufacturing plants, both large and small, will close down for vacations. Other than farm implements, most fields of consumption seem to be planning for high-level operations during third quarter.

Philadelphia—District warehouses expect a falling off in business this month, due primarily to seasonal influences. One large distributor anticipates a drop of at least 10 per cent on a tonnage basis, but a mild decline on a dollar basis, due to higher prices now in effect.

Newly announced sheet price schedules at Morrisville, Pa., will be reflected in a drop in hot and cold-rolled sheets, although just when remains to be seen, as distributors do not count on receiving much in the way of tonnage from this mill before late in the current quarter.

St. Louis—Warehouse steel stocks are improving under declining demand. Operators expect dollar volume to be off 10 per cent in July as compared to the average of the year's first six months. Supply is catching up and demand will be whittled further by July and August vacations.

Over-all inventories here are estimated at 70 per cent of normal, with spottiness in some items and sizes.

Cincinnati—Warehouse business has slowed down some due to vacations. The first six months of 1953 were ahead of the same period last year, sales and tonnage-wise, warehouses report. Inventories remain as unbalanced as they were a year ago.

Los Angeles—With fabricators buying lightly for current requirements, warehouse inventories are 60 per cent of normal. Bar size structural shapes, carbon bars under 1½ inches, some sheet items, and alloy steels are easier.

Seattle—Warehouse order volume slumped last week due to the holiday, also because of idled shipyards struck by machinists. Should this situation be extended it will have serious effect upon some defense projects and will be generally reflected in warehouse sales. The new price lists are being generally observed. Spokane is working on a temporary price schedule until a permanent list is adjusted to meet conditions in eastern Washingon.

Eastern Sheet Price Schedules Upset

Newly published prices f. o. b. Fairless Works on hot and cold-rolled sheets, while $2 above general market, result in lower delivered quotations at various consuming points

Sheet and Strip Prices, Page 164 & 165

Pittsburgh — Mill prices for five flat-rolled steel products that will start coming this quarter from U. S. Steel Corp.'s Fairless Works near Morrisville, Pa., have been set. Basing point will be Fairless, Pa.

The five products and their prices are: Carbon hot-rolled sheets (18 gage and heavier), 4.025 cents per pound; carbon cold-rolled sheets, 4.875 cents per pound; common coke tin plate (1.25 pound pot yield), $8.80 per base box 100 pounds; electrolytic tin plate (0.25 pound coating), $7.50 per base box 100 pounds; and black plate, $6.60 per base box 100 pounds.

These prices will be subject to the same extras and deductions in effect at other U. S. Steel Corp. mills.

At first, the flow of the five products from the Fairless Works will be in limited volume and size range. U. S. Steel had hoped to have the Fairless Works turning out finished products long before now, but difficulties with equipment delayed production.

While each of the five products are priced $2 a ton above like products produced by the Pittsburgh district mills of U. S. Steel, the delivered prices to eastern consumers will be lower from the Fairless Works, inasmuch as less freight cost will be involved.

The Fairless prices on carbon hot-rolled sheets and carbon cold-rolled sheets are $2 a ton more than Bethlehem Steel Co.'s prices at its Sparrows Point, Md., mill, but the Fairless prices on common coke tin plate, electrolytic tin plate, and black plate are the same as those at Sparrows Point. Despite the higher Fairless prices on carbon hot-rolled and cold-rolled sheets, the delivered prices in some eastern areas, such as Philadelphia and New York, will be lower from Fairless than from Sparrows Point.

While the supplying of some eastern consumers from the Fairless Works will take business away from the Pittsburgh district mills, it is not expected to hurt the Pittsburgh district as long as business is as strong as it is now. Even if business declines, the shock from the Fairless Works will be lessened by the reduction in U. S. Steel's Pittsburgh district capacity. Earlier this year, U. S. Steel lost about a million tons of ingot capacity when an open-hearth shop at the Homestead Works had to be closed for reasons of safety.

Boston — Carbon sheets, delivered New England points from the Fairless Works, although $2 per ton higher f.o.b. Morrisville, Pa., will be slightly lower than on tonnage shipped from Sparrows Point. At Boston, delivered price on hot-rolled sheets is 4.623 cents, and on cold-rolled, 5.473 cents. This means 35 cents per ton lower. It also is $4.65 per ton lower than prices quoted on sheets delivered Boston from Pittsburgh.

The gage range will be limited during the break-in period at Morrisville, although broadening each month until October when a new wide slabbing mill will be in operation. Initial production will be largely 18 and 24-gage cold-rolled and 10 to 12-gage hot-rolled. By October hot-rolled up to 3/16-inch is likely.

New York — The delivered price on hot-rolled sheets from Fairless, Pa., near Morrisville, to New York, will be 4.3125 cents. This is predicated on the newly announced base of 4.025 cents at the Fairless Works, plus a rail rate of .2875 cents per pound, before the 3 per cent tax, on steel in 40,000 pound carlots. The delivered price on cold-rolled sheets, same basis, will be 5.1625 cents with the new Fairless base at 4.875 cents.

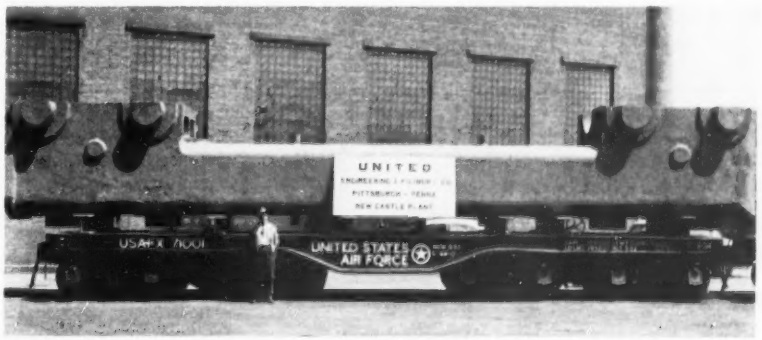
On the basis of 80,000 pound carlots, the rate from Fairless is .207 cents, before 3 per cent tax, bringing the delivered price on hot sheets to 4.232 cents, and on cold sheets to 5.082 cents. Despite the $2 per ton premium in the base prices at Fairless, Pa., over those at Sparrows Point, Md., the delivered price here from Fairless will be well under that delivered from Sparrows Point.

Cleveland — Establishment of base prices on hot and cold-rolled sheets at Fairless, Pa., $2 per ton above the levels generally quoted at other producing points, is seen as enabling producers in the Midwest to reach consumers further to the East than formerly and with less freight absorption.

Actually, however, not much change in the distribution pattern is expected until such time as something approaching supply-demand balance is achieved to permit a real test of pricing policies.

Currently, the mills are booking orders for fourth quarter, tonnage being accepted for the entire period except for certain specialties for which October has been blanked out to care for expected carryover from third quarter. The carryover from second to third quarter was substantial and there will be practically no open tonnage available this period.

Vacation suspensions and other seasonal influences, as well as the fact that the strike threat has been removed and prices have been stabilized at higher levels, are serving to take some of the demand pressure off the market. While there are no cancellations of consequence, buyers are



United Casts 200-ton Steel Column

This 200-ton steel column, being shipped from the New Castle, Pa., plant of United Engineering & Foundry Co., Pittsburgh, is one of four such columns that will be needed for an 8000-ton forging press that United is building for the United States Air Force. It measures 52 ft long, 7 ft wide, 9 ft high and is one of the largest castings ever produced by United. This is the first of 25 large castings which are being cast by the company for the Air Force's heavy press program. In addition to the 8000-ton forging press, United is also building a 35,000-ton forging press and a 12,000-ton extrusion press

ordering more conservatively, seeking to cut corners on specifications wherever the opportunity is presented.

Cincinnati—Demand from the appliance industry appears to be tapering off some but the automotive industry continues taking all the sheets it can get. As a result there is no softening in the local market.

Birmingham—Sheet production continues to run considerably behind demand in both hot and cold-rolled.

Semifinished Steel . . .

Semifinished Prices, Page 164

Chicago—U. S. Steel Corp. shut down its No. 2 open-hearth shop at Gary steelworks on July 3 for maintenance work which will take about two weeks. Reduced supply of hot metal brought about by the blowing out of No. 6 blast furnace July 9 for repairs was a factor in the decision to close down the open-hearth shop to facilitate and speed the maintenance work.

Steel Bars . . .

Bar Prices, Page 164

Boston—Several mills have opened books for fourth quarter on both carbon and alloy bars. Consumers who readjusted their buying pattern for fourth quarter to avoid extras are also following through on this for the closing three months of the year.

There is pressure to return to 3-ton base quantity in hot-rolled alloys. More specifications are noted for alloys in the higher molybdenum group, also chromium, but as nickel is not available in ratio these alloys are in the non-standard category.

New York—Most bar producers have opened books for fourth quarter, a few of them on a month-to-month basis. Virtually without exception producers of hot-holled carbon bars will have a carryover at the end of this quarter of at least two weeks.

Philadelphia—Despite vacation curtailment of operations at various consuming plants, a tendency that will prevail in one degree or another for several weeks to come, hot-rolled carbon bar producers are still confronted with requests for more tonnage in third quarter than they can accommodate.

Some mills doubt there will be any real balance in supply and demand this year, although they look for a more pronounced easing in the fourth quarter, especially if there is an appreciable letup in automotive requirements, as some anticipate.

Pittsburgh—Hot-rolled bars, particularly in sizes over 1½ inches in diameter, are expected to remain tight. For many of these bars, hot-topped steel is required. Hot-topped steel is needed also for the government's shell program, and that program is to be as large in fourth quarter as it is in the third.

Hot-topped steel is not required for as great a proportion of bars under 1½ inches as for bars over that size.

Automobile manufacturers are taking all the hot-rolled bars they can get, although they are altering their specifications so they can shift some of the bar tonnage from lagging truck production to the more spirited output of passenger cars.

Cold drawers are said to be in an improved position on small sizes of bars not only because of an improvement in supply of hot stock for small sizes but because of the easier supply of wire rod from which they can draw small bars.

Warehouses are becoming increasingly selective in purchase of bars.

Cleveland—The bar mills are opening books for fourth quarter tonnage and expectations are they will have no trouble filling schedules. Substantial carryover from second to third quarter will preclude much open tonnage in this period, especially in the larger sizes, and most sellers think there will be a carryover from third to fourth quarter.

Chicago—Save for the farm implement industry, demand for bars holds at strong level. Otherwise, all important consuming groups are taking their full mill quotas. The waning in requirements of automobile makers, which had been freely predicted, is not materializing, nor is there any indication it will during the next three months.

Los Angeles—Demand for bars above 1⅜ inches is strong but supplies are spotty. Cold drawers will receive 20 to 60 per cent of hot-rolled bar allocations in July and August which will depress operations of one large cold-finisher to 40 per cent of capacity compared with 70 per cent last August.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 164

Seattle—The July holiday and vacations will reduce rolling mill production this month. Northwest Steel Rolling Mills will observe a 2-week vacation period during which time semi-annual overhaul of rolling equipment will be made. Furnaces will operate through the vacation period.

The mills report a fair volume of small orders, and backlogs are sufficient to support high level operations through third quarter. It is reported 34,000 tons of reinforcing for The Dalles power project, Columbia river, have been placed with the Oregon Steel Mills.

Structural Shapes . . .

Structural Shape Prices, Page 164

Philadelphia—Bridgework is the major activity in structurals at present and the market is featured by an inquiry for 3745 tons for a project in Philadelphia and Montgomery counties, Pa., bids closing July 31. Currently, awards are light, and insofar as commercial work is concerned, not much business is in immediate prospect.

Birmingham—District fabricators are well booked on miscellaneous items. Ingalls Iron Works Co. booked 6650 tons for the John Sevier steam plant of the TVA. The order was valued at more than $1,500,000.

Seattle—Pending structural awards are sizable. The largest, 3000 tons for The Dalles dam, bids in, and 2100 tons for Bonneville transmission towers, await official approval of Washington, D. C. Additional tonnages are required for expansion of Hanford Works. The Fairchild Air Base hangar, which called for 5000 tons, has been indefinitely postponed. Fabricators have fair backlogs but seek fourth quarter orders.

Wire . . .

Wire Prices, Page 166

New York—Incoming orders of high carbon specialties about match shipments, but on numerous wire products deliveries are becoming more current or nearer normal. Music wire is now available in all sizes in three weeks whereas some gages took six weeks until recently. Other gages have for some time been available from stock.

There are scattered deferments on automotive tonnage, but hardly enough to establish a trend for the steel industry as a whole. Inventories of valve spring and other wire goods with automobile builders are relatively higher than for sheets, bars and other finished steel. One reaction to price increases appears to be more caution in forward buying. Indiana Steel & Wire Co., Muncie, Ind., has a contract for approximately 1250 tons, galvanized steel camouflage wire netting, Corps of Engineers, New York. There are 544,481 rolls involved, Muncie mill quoting $8.32 per roll.

Boston—Although August wire bookings are heavier than realized earlier, there are openings on numer-

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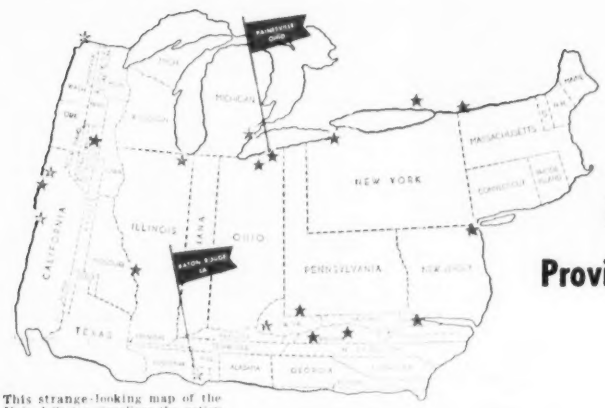
Sulfuric Acid Plants



This strange-looking map of the United States visualizes the nation as it might appear if the size of each state were determined by the value its manufacturing concerns add to the nation's industrial output. It is based upon the figures appearing in the 1949 and 1950 Annual Survey of Manufacturers prepared by the U. S. Department of Commerce, Bureau of the Census.

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Just phone or write the nearest General Chemical office for further information on how General's Sulfuric facilities can best be put to work for you.

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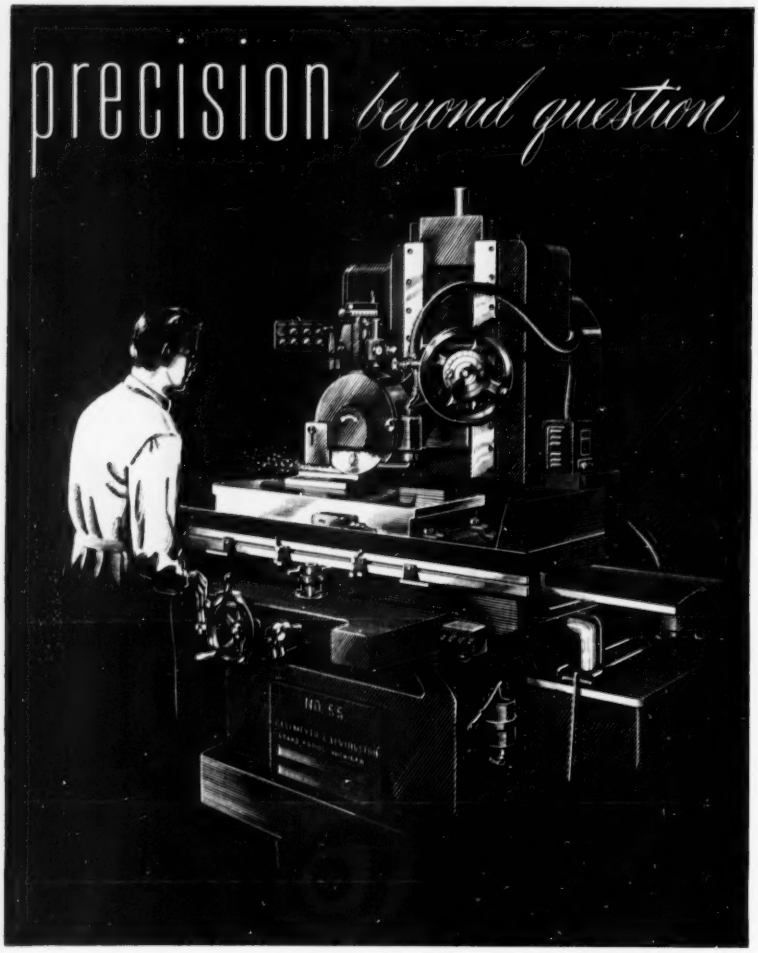

The requirements exacted of surface grinding machines leave no room for variation. Precision and tolerance control must be built-in. Through the years Grand Rapids Grinders have demonstrated the highest quality and unquestioned dependability of performance. Upon this record they have been accorded world-wide acceptance as standard of the industry. Here is precision beyond question.

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GRAND RAPIDS GRINDERS

MANUFACTURERS OF
SURFACE GRINDERS, CUTTER AND TOOL GRINDERS, TAP AND DRILL GRINDERS

GALLMEYER & LIVINGSTON

ous products for September and orders for that month are slow coming in. Lead-time for September, July 15, will pass with numerous usual fixed term orders missing. This includes some normal buying of cold-heading stock.

Chicago—Full production of manufacturers wire items seems assured for third quarter. There has been no diminution in demand nor is any indicated for near future. Merchant products on the other hand are not in strong demand although there has been some pickup recently.

St. Louis—Wire holds in high demand here, although competitors in other districts are reported looking for business. High carbon wire is especially tight and low carbon only moderately less so.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Pittsburgh—Reflecting the strong competition for business among producers of electricweld mechanical tubing, another important producer has begun to absorb costs of freight for delivering this product to consumers. Among users of electricweld mechanical tubing are the automobile industry, furniture makers and bicycle producers.

The increase in competition for electricweld mechanical tubing business is said to stem from a reduced demand for that product and an increase in capacity to produce that product.

The demand for buttweld pipe, most of which goes to the merchant trade, has not become as soft as some people thought it would. However, most jobbers are well stocked with this item.

Beaver Falls, Pa. — The Tubular Products Division, Babcock & Wilcox Co., last week announced revisions in prices covering seamless carbon steel pressure and mechanical tubes and welded stainless mechanical pressure and ornamental tubes produced here.

St. Louis—Pipe demand is slowing noticeably, although producers anticipate no trouble filling third quarter books. Specifications are arriving unusually late. The slowup is attributed to improving warehouse inventories, especially in the usually tight residential sizes.

Los Angeles—New 30-inch pipeline to be constructed by Southern California Gas Co., and Southern Counties Gas Co., part of a $210 million expansion, is adding to demand for skelp and plate.

Seattle—The cast iron pipe mar-

(*Please turn to page* 177)

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Automatic Twine Sealing Bag Ties Tackers and Staplers

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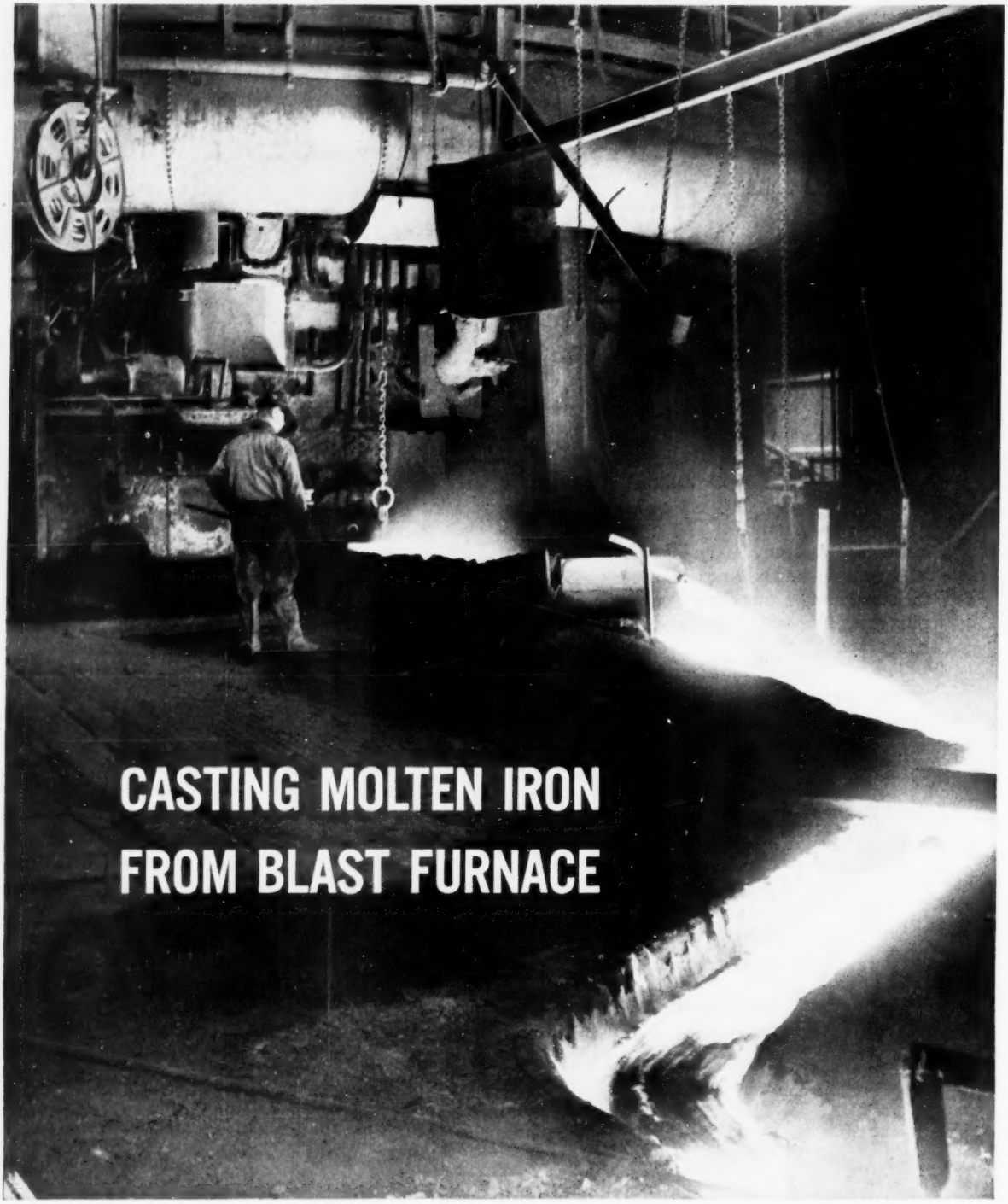

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INTERNATIONAL HARVESTER

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Tubular Goods . . .

(*Continued from page* 174)

ket is quiet, no important projects being up for immediate bidding. Most calls invite alternatives. Agencies report cast iron deliveries can be made in this area within three or four weeks after orders are placed. This enables them to compete on a time basis with other types of pipe, but eliminates mill order backlogs which is a disadvantage from an operating standpoint. Current sales consist largely of carlots.

Plates . . .

Plate Prices, Page 184

Philadelphia—Most plate producers have opened books for fourth quarter for commercial tonnage, as well as for rated defense work, and have allowed for a third quarter carryover of two to three weeks in some cases. One district mill, however, whose schedules have been hampered by work on a modernization program, is only now opening books for September, with the probability that not much new tonnage will be added because of arrearages.

Boston—With the exception of lighter and narrow sizes, plate supply is improving. This reverses the former trend. Until substantial strip-sheet mill production devoted to plates was returned to sheet output, light plates were in ample supply. In but a few weeks this balance has been worked off by fabricating shops and to considerable degree with warehouses. Not only has light plate production off strip mills been curtailed, but producers are reluctant to roll lighter plates on heavier and wide mills, banned under controls.

Pittsburgh—Demand for carbon steel plates and structural shapes will continue to be strong, if the activity of fabricators' estimating departments is an accurate guide. Those departments are still busy.

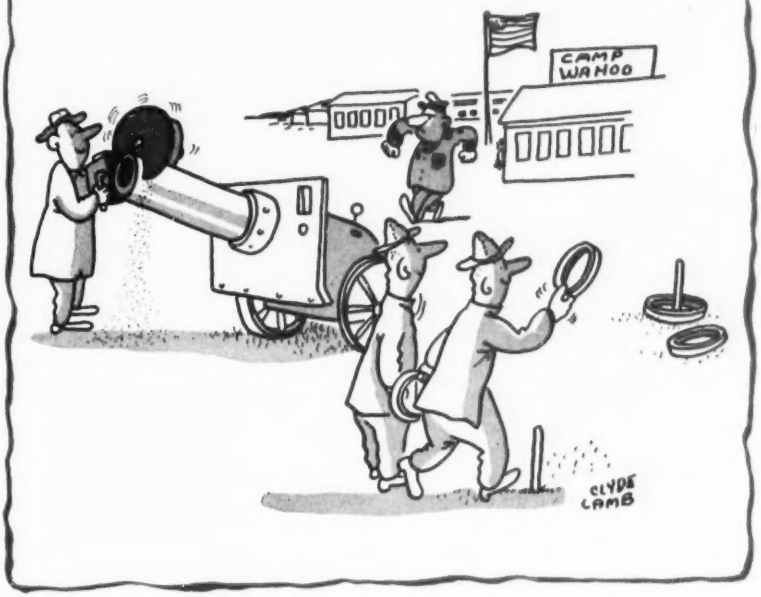
Because of a large business volume and an inadequate supply of plates, one fabricator is quoting delivery of tanks for not earlier than the third quarter of next year. Another indication of the difficulty in procuring plates is the offer of a fabricator to buy some stainless steel from a producer if that producer would supply him some carbon steel plates.

Tightening the plate supply is the discontinuance of production of light plate on continuous sheet mills. Before government production controls expired at the end of June, steel mills were to devote some of their sheet mill production to light plates to help

the *tougher* the cutting job . . .

the *better* the opportunity for . . .

Abrasive Cutting



We question the judgment of G. I. Joe, but even the General knows that Allison Wheels cut rings around competition. Fact is, whatever the material or the conditions, there's an Allison Abrasive Wheel that does a more economical and efficient cutting job. Steel, non-ferrous metals, bar stock, tubing . . . whatever it is, Allison Wheels cut cleanly at high speeds.

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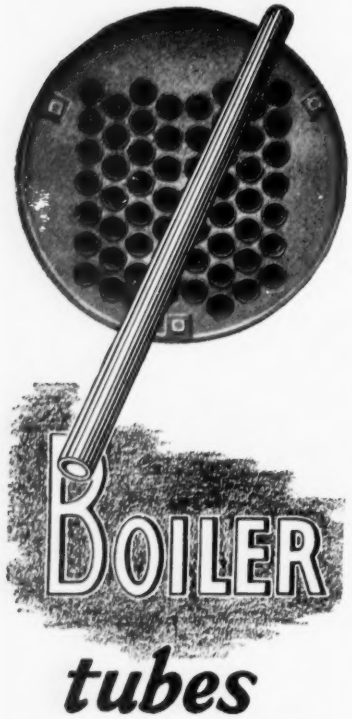

Uniform strength, accurate dimensions and high ductility are three of the many qualities found in Murray boiler tubes. Welded or seamless tubes in sizes ranging from ⅝- to 8-inch OD are available for immediate shipment from warehouse stocks.

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WRITE FOR CURRENT TUBE STOCK BULLETIN

Other Murray products include carbon and stainless steel tubing and pipe for pressure and mechanical purposes; welding and screw type pipe and tube fittings. Tube bending, upsetting, swaging.

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ease the plate supply. Reduction of light plate production on the continuous mills is expected to cut the total plate supply by 15 to 20 per cent this month.

Because of the road and bridge construction still needed in this country, the demand for plates and structurals is expected to remain strong for a long while. A drop in demand for sheets, however, might prompt some producers to divert more steel into plates.

Demand for floor plate is not heavy, and supply is adequate.

Birmingham—Some regional plate users continue to get what tonnage they can from distant sources in view of the continuing shortage.

Los Angeles — With pressure stronger from chemical, petrochemical, and petroleum interests, fabricators could use 3 to 4 times as much plate tonnage as they are getting. Plate supplies have slowed to a trickle. Geneva plant of Columbia-Geneva Division, U. S. Steel Corp., blanked out July and August for arrearages.

Seattle—Unconfirmed report here is that 10,000 tons of plates involved in the Ferndale, Washington state, refinery for General Petroleum Co., have been placed with two of the larger fabricators in this area by Bechtel & Co., general contractors. U. S. Engineer, Seattle, will take bids July 14 for refueling and other facilities at Eielson Field, Alaska, involving storage for 180,000 barrels, 750 tons of plates. Bids are in for fuel tanks at Mountain Home, Idaho.

Smaller fabricators report a good volume of small tonnages but because of the continued scarcity of plates bidding is difficult as all commitments must be covered by definite delivery contracts for materials

Iron Ore . . .

Iron Ore Prices, Page 182

Cleveland—Heading toward a record season movement, iron ore shipments from upper lake ports are continuing in record weekly volume. During the week ended July 6, the fleet moved 3,179,900 gross tons, according to the Lake Superior Iron Ore Association. This was down from the 3,317,475 tons hauled in the preceding week, but contrasted sharply with the 85,822 tons shipped in the corresponding week of last year when the lake fleet was idled by the steel strike.

The latest week's ore movement brings the season total to date to 38,527,293 tons. This compares with 21,581,585 tons shipped in the like period of the 1952 season.

June shipments of lake ore this

reducing troubles?

Torrington Swaging Machines offer a means of reducing rod, wire and tubing that improves the quality of the material, gives a better surface, without waste of stock. Hammer blows (4000 a minute) speed production, and give the metal toughness and resiliency that cannot be obtained by any other method.

Write for your free copy of "The Torrington Swaging Machine." This informative booklet gives complete details on the art of swaging and the extensive line of Torrington Swagers.

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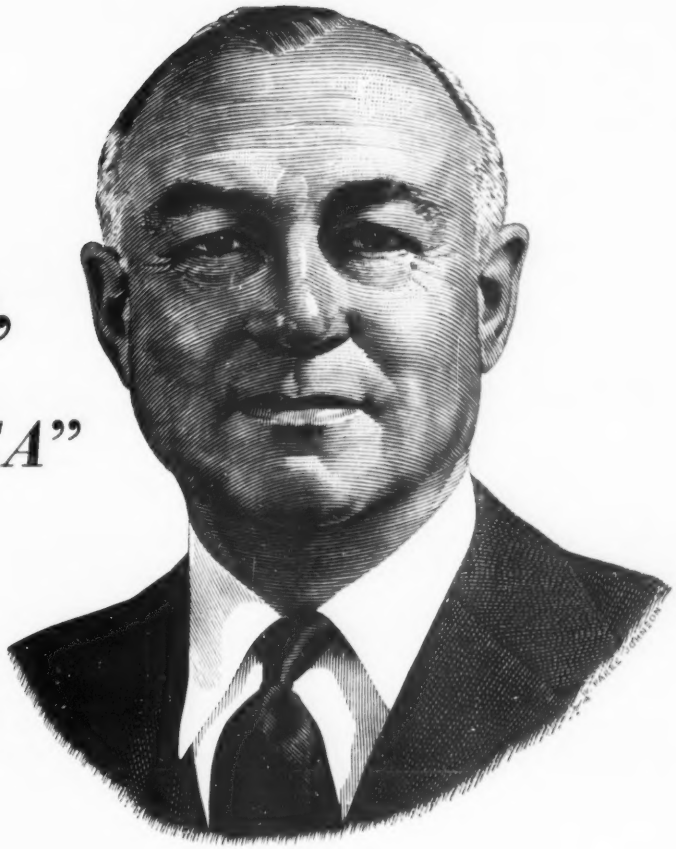

GEORGE M. HUMPHREY
Secretary of the Treasury

"Few things in America contribute more importantly to national security than the Payroll Savings Plan—the vehicle through which millions of employed men and women build security, counteract inflation and create a reserve of future purchasing power by their monthly investment in U. S. Savings Bonds. Credit for this outstanding influence in our lives is due largely to a team that is typically American... far-sighted business executives who have made the Payroll Savings Plan available to the employees of 45,000 companies... 8,000,000 Payroll Savers... publishers of more than 500 business magazines and the management of the other advertising media who contribute generously of their space and time... the Advertising Council and advertising agencies who give freely of their skills. To these and to all who have a part in building the Payroll Savings Plan, the U. S. Treasury Department welcomes this opportunity to say, "Well done, America."

Do you know—

• on May 1, 1953, the cash value of Series E Bonds outstanding—the kind bought by Payroll Savers—reached a new record high—$35.5 billion—$1 billion more than the value of E Bonds held on May 1, 1951, when E Bonds commenced to mature.

• cash sales of Savings Bonds, all series, during the first four months of 1953 totaled $1,741,273,000—22% above those of the first four months of 1952.

• of the approximately $6.7 billion E Bonds which had come due up to the end of April, 1953, $5.1 billion, or 75% were retained by their owners beyond maturity.

• every month, nearly 8,000,000 Payroll Savers purchase about $160,000,000 in Series E Bonds.

For assistance in installing a Payroll Savings Plan, or building participation in an existing Plan, write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

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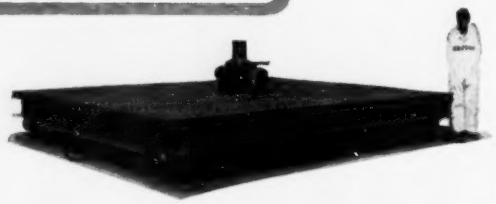
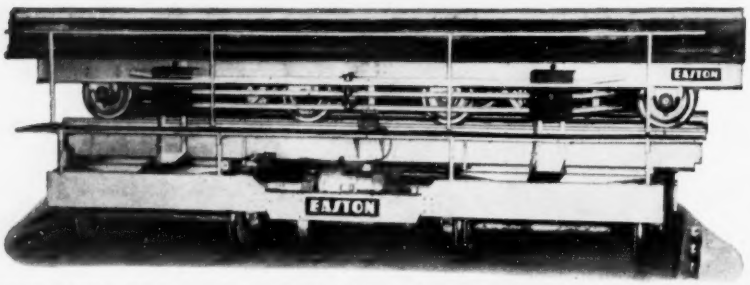


Motor Driven Cars

EASTON experience covers small and large capacity furnace cars for every requirement, including electric self-propelled cars for automatic continuous heat treating systems.



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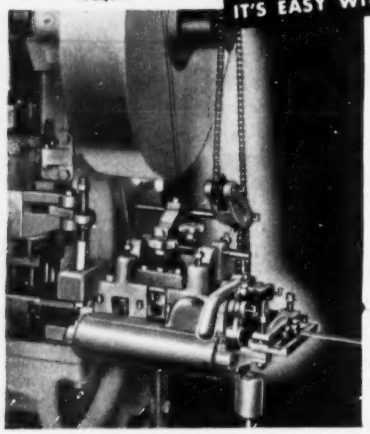
Automatic Roll Feeds



Wittek automatic roll feeds fit all makes and sizes of punch presses—provide maximum efficiency and extreme accuracy in the high speed automatic feeding of strip stock. Made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any direction. Length of feed is easily adjusted to meet individual requirements.

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Simplify Handling of Coiled Stock

Choice of standard models to facilitate handling coiled stock . . . from small, light coils to those weighing up to 800 pounds. Larger reel stands automatically center the coils – provide frictional braking action to prevent overrunning, maintain uniform coil slack.

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WITTEK Manufacturing Co.
4328 W. 24th Place, Chicago 23, Illinois

Automatic ROLL FEEDS AND REEL STANDS

year totaled 13,744,894 tons, surpassing the movement of June last year by 11,257,970 tons.

Pig Iron . . .

Pig Iron Prices, Page 160

Philadelphia—Movement of pig iron the past week reached the lowest point so far this year, due chiefly to numerous suspensions at foundries for vacations. Actually, vacations and warm weather will have a retarding effect on iron shipments for some time. District foundry operations this month will probably be off 15 to 20 per cent for these reasons, it is estimated, with no full restoration until after Labor Day.

Meanwhile, the recent $1.50 increase in domestic iron prices is being accepted by consumers without particular comment, although perhaps sharpening their interest in foreign iron as time goes on.

Recently, foreign sellers have been disposed to make more attractive offers but not sufficiently to attract widespread buying. Most of such tonnage as has been bought recently has been non-standard material.

A tonnage of Indian off-grade iron, the first lot of Indian iron reported sold in this country in a long time, has been purchased by a district mill at virtually scrap value, $43.50, f.o.b. cars, Philadelphia, duty paid, per gross ton. Fifteen hundred tons of Swedish iron, .06 in sulphur and high in phos, was sold to a Baltimore consumer at an undisclosed price. A good quality basic is said to be offered by Italy. Germany, as noted recently, is offering good quality basic at $53, duty paid, Philadelphia.

Pittsburgh—Four of the 56 blast furnaces in the Pittsburgh district are out for relining. All of the four belong to U. S. Steel Corp. Latest of the four to go down is American Steel & Wire Division's No. 1 stack at Donora, Pa. It went down on July 5.

Other three furnaces out are U. S. Steel's No. 3 and No. 4 at Duquesne, Pa., and No. 6 at U. S. Steel's Edgar Thomson Works, Braddock, Pa. The Duquesne No. 3 stack which has been out since Feb. 27 for relining and modernization is due to come back into production momentarily. The Duquesne No. 4 stack has been out since May 28 and the Edgar Thomson No. 6 stack has been out since May 14.

The Pittsburgh district's number of blast furnaces will drop from 56 to 54 early in August when U. S. Steel closes its 83-year-old Isabella furnaces at Etna, Pa. Both of these stacks have been producing ferroman-

(*Please turn to page* 187)

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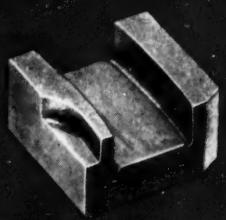
OILITE does it—
with FINISHED MACHINE PARTS

machining this segment costs ..... $.70

OILITE segments cost ..... $.08



machining this mating slide costs $1.30

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- TIME SAVINGS—electrodes quickly, easily inserted and removed.

For the toughest electrode-consuming job in your plant, order a supply of WW-Kaptrode Electrodes NOW!

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ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in Italic.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematites (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$55.00
Domestic scheelite, mine	63.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.21 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom. $32

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $99.30; Salina, Pa., $104.55; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $99.30; Hays, Pa., $105.10; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $109.70; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $179.55; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $69.30; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $92.40; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $127; Johnstown, Pa., $127.30; Clearfield, Pa., $135; St. Louis, $138; Athens, Tex., $140.90.

Nozzles

Reesdale, Pa., $203.20; Johnstown, Pa., $208.40; Clearfield, Pa., $219.45; St. Louis, $224.65; Athens, Tex., $225.20.

Runners

Reesdale, Pa., $158.20; Johnstown, Pa., $161.70; Clearfield, Pa., $168.60; St. Louis, $170.30; Athens, Tex., $174.40.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $166.30; Danville, Ill., $169.30.
60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $210.20; Danville, Ill., $213.20.
70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $244.85; Danville, Ill., $247.85; Clearfield, Pa., $252.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00
New River foundry	20.80
Wise county foundry	15.95
Wise county, furnace	15.20

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, del.	*26.00
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	26.58
LoneStar, Tex. ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
St. Paul, ovens	**23.75**
Portsmouth, O., ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44-45
Birmingham area	$49.50

Cents per pound, ovens

Phenol, 40 (carlots, nonreturnable drums)	17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

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Make Sheet Metal Salvaging a Profitable Operation in Your Plant

Wherever sheet metal scrap accumulates in volume, it presents two problems: *First* — neat, orderly disposal with minimum disturbance to plant operation. *Second* — profitable salvaging.

A well integrated scrap salvaging operation, built around the right size and type of baling equipment, can solve *both problems* for you just as it has for many others.

The Galland-Henning Hydraulic Baling Press is fast, powerful and rugged . . . designed and constructed to convert stampings, clippings and other loose scrap into dense, compact bales at lowest possible cost per ton . . . bales that always command premium prices on the scrap metal market.

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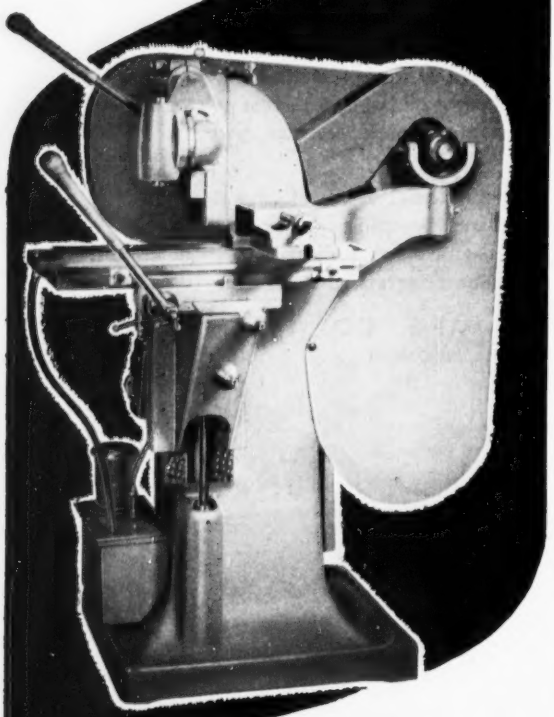

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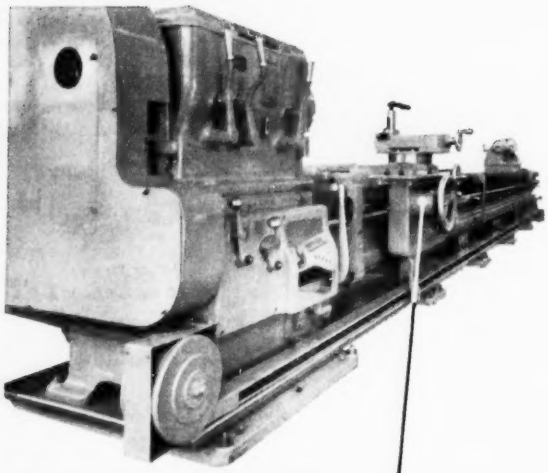
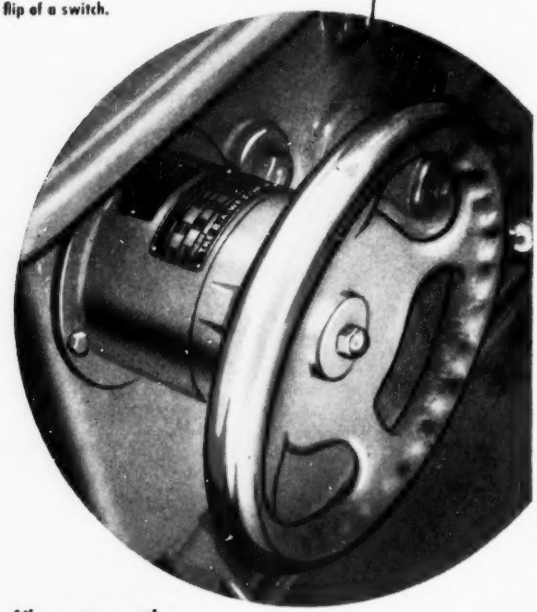
Suggestions as to how a U. S. No. 1 Milling Machine can cut costs on your particular production needs, as well as complete data on the basic machine and attachments, gladly furnished on request.

THE U. S.-BURKE MACHINE TOOL DIV.

Brotherton Road 10, Cincinnati 2, Ohio



This is a 36" Series F heavy duty engine lathe, one of the fine precision machines produced by The Nebel Machine Tool Company of Cincinnati. A feature of this long bedded beauty is the power operated Rapid Traverse which moves the heavy apron quickly and surely in either direction at the flip of a switch.



Like so many other builders of fine machine tools Nebel called on Wesche to design and produce the torque motor that puts the power on the spot where the power is needed. Specifications called for ½ h.p., 3 phase, 60 cycle, 220/440 volt with a special mounting and special winding to provide the *exact* torque required.

Wesche Special Motors begin where standard motors stop. Send for catalog outlining our custom motor service which includes data form for easy ordering of special motors. Write:

THE B. A. WESCHE ELECTRIC CO. (Welco)

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $85, Palmerton, Pa.; $85, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $225 per gross ton of alloy, c.l. packed $237; gross ton lots, packed, $252; less gross ton lots, packed $265; f.o.b. Ohio or Marietta, O., Lynchburg, Va.

(Mn 74-76%, C 7% approx.) Base price per net ton $200, Etna, Johnston and Sheridan, Pa.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $267; less gross ton lots, $284, f.o.b. Chicago. Add or subtract $2.80 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

(Mn 76-80%) 13.1c per pound of contained Mn, f.o.b. Alloy, W. Va.; Niagara Falls, N. Y.; Ashtabula, O.

(Mn 79-81%) Lump, $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn. carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max, 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P. 0.06% max). Add 0.5c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C. 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min, Fe 2% max, Si 1% max. C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 30c; ton lots, 32c; 250 to 1999 lb, 34c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max. Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max. Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr., c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr. 67-72%) Contract, carload, lump, bulk, max. 0.03% C 37.60c per lb contained Cr, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. 8 M x D, bulk, 26.25c per lb of contained Cr. C.l., packed 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr. 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-39%, Al 7-9%, C 0.05% max.) 25.75c per lb of contained silicon plus 16.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract carload, 1" x D; packed, max 0.50% ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c; prices on 0.10 per cent carbon grade, C grade, $1.12 per lb of contained chromium. up 4c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 10.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l lump bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c Freight allowed. Spot add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6. 68c; No. 79, 50c. freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 10,000 lb W or more, $4.35 per lb of contained W; 2000 lb W to 10,000 lb W, $4.45; less than 2000 lb W, $4.57, f.o.b. Niagara Falls, N. Y.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c, F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (19-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.56c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packed 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max) Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx. Ta 20% approx, and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ⅛" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

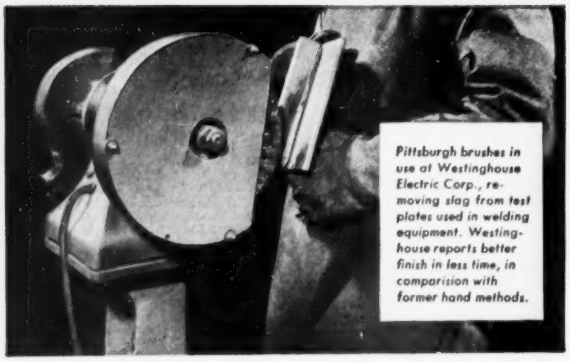
V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Biglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13. f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.



Pittsburgh brushes in use at Westinghouse Electric Corp., removing slag from test plates used in welding equipment. Westinghouse reports better finish in less time, in comparision with former hand methods.

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—as these companies did:

Removal of imbedded slag in welding test plates formerly was done by hand at the Westinghouse Electric Corp., Trafford, Pa., using a wire brush and welder's hammer. Pittsburgh brushes, powered by a direct-drive ½ h.p. motor, now remove more slag in less time, and produce a better finish. In addition, Westinghouse reports their Pittsburgh brushes "stand up better than average in use."

Complete cleaning of dried concrete, rust and scale from steel frames used in concrete forming is essential prior to re-using the forms. Pittsburgh wire brushes were installed at the Universal Form Clamp Co., Chicago. Working on a conveyor-fed machine, the Pittsburgh brushes now remove all foreign material at a rate of 50 pieces per hour, replacing former laborious hand brushing and scraping.

De-scaling preheated bar stock at the Dominion Forge & Stamping Co., Ltd., Canada, was formerly done by hand scraping. This never did a complete job, and inclusions resulted which produced defective forgings. Pittsburgh brushes, on specially-designed machines, now do the job, and have "increased efficiency, decreased the amount of scrap, improved work quality, and saved labor."

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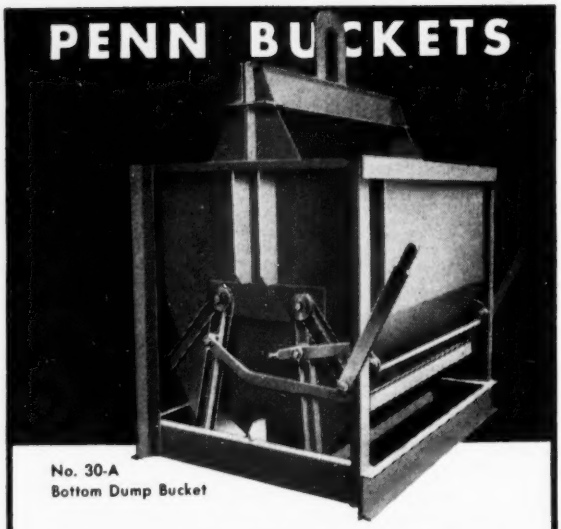

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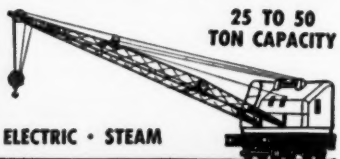

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Pig Iron . . .

(*Continued from page* 180)

ganese. Production of this product will be moved to the corporation's Duquesne Works, where one blast furnace now is making ferromanganese.

The corporation had planned to close the Isabella furnaces shortly before World War II and again after the war ended, but with the outbreak of the Korean war the stacks were continued in blast.

Although obsolescence of the old furnaces at Isabella was given as the main reason for their abandonment the corporation also took into consideration the new ferro cleaning plant at Duquesne.

Boston—Increase of $3.75 per ton for foundry iron by the district blast furnace compared with $1.50 by Buffalo sellers brings the equalization point between Buffalo and Everett, Mass., delivered basis, approximately Barre, Mass., and opens up areas in Connecticut where outside producers are competitive.

New York—Movement of pig iron is picking up some, fewer foundries now being down for vacations. However, most pig iron sellers look for moderate dullness throughout the summer because of seasonal influences—hot weather and vacations.

Cleveland — Vacation suspensions at various foundries in this area will result in some accumulation of pig iron tonnage and for the next few weeks merchant iron sellers will be under noticeably less pressure for tonnage. However, no substantial piling of iron at furnaces is indicated as yet, and the view is that no heavy stockpiling is likely.

Chicago — Numerous gray iron foundries are closed for vacations, thus the current iron melting rate in the district is reduced considerably. Temporarily at least, this will ease demand for pig iron. In recent weeks pressure for iron has diminished progressively. On the other hand, necessary repairs to blast furnaces will reduce iron production over the next 60 days.

Youngstown—No. 4 blast furnace at Youngstown Sheet & Tube Co.'s Campbell Works has been blown in after about three weeks' idleness. Furnace was partially relined. Five blast furnaces here are idle.

Birmingham—Pig iron demand continues somewhat off with pressure pipe and soil pipe production soft. Merchant iron producers are accepting what business is offered. All three district merchant producers have increased prices $1.50 a ton.

San Francisco — Pig iron prices have been raised by the two producers in this area, Columbia-Geneva Steel Division, U.S. Steel Corp., in Provo and nearby Ironton in Utah, and Kaiser Steel Corp. in Fontana, Calif. Both boosted prices $1.50 a ton.

Scrap . . .

Scrap Prices, Page 190

Washington — Ferrous scrap consumption in May reached 6,299,000 gross tons, according to the Bureau of Mines. This is an increase of 72,000 tons over April, but the daily rate of consumption in May was lower. Purchased scrap use totaled 3,084,000 gross tons and home scrap 3,215,000.

Consumers' stocks of scrap dropped to the lowest level since June 30, 1952, at the end of May. Preliminary total domestic stocks of all ferrous scrap was 7,044,000 tons on May 31. Purchased scrap stocks at that time were 4,640,000 tons—8 per cent below the 1952 record high of 5,051,142 tons on September 30 and 181,000 tons below the Apr. 30 total.

Preliminary figures show that dealers and automobile wreckers held 1,060,000 gross tons of scrap on May 31. Producers and railroads held 142,000.

Pig iron consumption rose to a record 6,099,000 gross tons in May. Average metallic charge of foundries and steelmaking furnaces was 49 per cent scrap and 51 per cent pig iron.

Pittsburgh—Prices of all grades of scrap remain unchanged, No. 1 heavy melting being $44-$45, and No. 1 cupola cast being $42-$43.

Undertone of the market on steelmaking grades is strong despite only a moderate amount of buying. While one large buyer of steelmaking scrap has bought for July delivery, another large consumer has not found it necessary to come into the market yet. The flow of scrap to mills is being bolstered by settlement of a strike of Union Barge Line Corp. employees. That line is a big hauler of scrap in this district.

Demand for cast grades continues light.

With No. 1 heavy melting at $44-$45 while there's only a modest demand for steelmaking grades of scrap, there's some speculation that if the current high rate of steel production continues into the coming winter the price will climb to $50.

Philadelphia—Scrap prices are unchanged except on heavy turnings which are up about $1 a ton to a spread of $42 to $43, delivered. In general supply and demand are in fair balance insofar as steel scrap is concerned and no particular weakness

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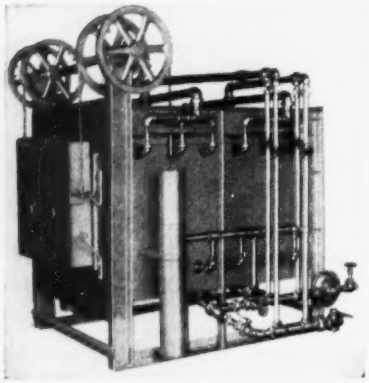
LARGE CAPACITY
OVEN TYPE FURNACES



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is noted in the cast grades, although consumption has been hit by suspensions at various foundries for mass vacations.

Boston—Heavy melting steel is firmer, notably No. 1 heavy at $33 to $34 shipping point. This is strength contributed by outside buying. District consumers are buying little, but take shipments against old contracts. Cast grades are slow with the movement of scrap to consumers at low point.

New York—While scrap trading is lagging, brokers' buying prices are unchanged throughout the list. Extreme dullness in cast grades is being more or less discounted as a passing phase, because of the widespread vacation suspensions.

Buffalo—Some concern is apparent among scrap dealers here over failure of recent market strength to develop higher prices. Two top mill consumers have placed new business within current price ranges.

Cleveland—The scrap market here is in the vacation doldrums. Mill buying is at a virtual standstill and the yards are taking in little material due to suspensions of manufacturing plants for vacations. Nevertheless, the undertone of the market is strong and the steel grades are quoted up $1 per ton, largely reflecting anticipated active demand in August.

Detroit—Upward adjustment of No. 2 grades to normal price spreads continues with demand solid. Observers see a gradual dip in prices over the weeks ahead but no sudden changes in the market picture.

Cincinnati—The scrap market remains generally strong. Price activity was strongest in cast grades with No. 1 cupola and charging box cast and drop broken machinery advancing $2 a ton and heavy breakable cast moving up $3 a ton. Malleable also is up $2 a ton. Machine shop turnings are listed at $25 a ton, a $2 a ton decline.

Chicago — Open-hearth scrap continues in price stability following the recent purchases by mills for July requirements. Cast grades are slightly stronger, however, and railroad items are under upward pressure despite consumer resistance. Between now and Sept. 1 scrap production will shrink as result of vacation closings of many manufacturing plants.

St. Louis—Wave of speculative buying has sent scrap prices here sharply upward despite a scarcity of new consumer orders. Speculation was launched by reports of buying in other markets at prices higher on original order and boosted again on reorder.

The upsurge boosted quotations on No. 1 melting steel $6 and short rails $11. Cast grades got their first uplift in months when a major steel castings company placed a tightly-specified order for heavy breakable at $36, a $3 rise over earlier quotes.

Birmingham—Sluggishness continues in the district's scrap market with the increases reported in most other sections not evident here.

Los Angeles — With substantial scrap inventories, steel mills are buying in July on the same basis as in June.

San Francisco—Slight shading of the price on No. 1 cupola cast with some sales reported in the $37 to $38 a ton range, but with the bulk of the shipments going at $38 to $39, features the district scrap market. Strengthening of demand for steel grades in southern California, with Kaiser Steel Corp. reported back in the market, is viewed with interest.

Seattle—While the scrap market continues weak, there are elements of potential strength that may result in price rises by August or September. Some of the largest buyers are out of the market and are using inventory. These conditions may result in a firmer tone within 60 days as buying is resumed. On the other hand, there is strong pressure in some sections of the industry for export licenses to relieve the market of grades that are in surplus and in poor demand here, but which can readily be disposed of in Japan.

Canada . . .

Toronto, Ont.—Iron and steel production in Canada continues to run above the high record made in 1952.

April output of pig iron was 241,583 net tons for an average of 87 per cent of total capacity, and compares with 238,572 tons or 83 per cent for March and with 214,330 tons or 86.2 per cent of rated capacity for April, 1952.

For the four months ending with April production totaled 949,943 net tons against 863,400 tons in the like period of 1952.

Production of steel ingots and castings in the month amounted to 362,291 net tons for a daily average of 95.3 per cent of rated capacity.

In the first four months this year cumulative production of steel ingots and castings totaled 1,373,517 net tons compared with 1,245,645 tons in the like 1952 period.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

750 tons, plant expansion, Aluminum Co. of America, Vancouver, Wash., to Isaacson Iron Works, Seattle.

130 tons, Railway Express terminal, Philadelphia, placed through Pennsylvania Railroad with Bethlehem Steel Co., Bethlehem, Pa.

150 tons, fertilizer plant, Carstens Packing Co., Tacoma, Wash., to Pacific Car & Foundry Co., Seattle.

100 tons, high school, Ketchikan, Alaska, to unstated interest; Carson Construction Co., general contractor.

STRUCTURAL STEEL PENDING

3745 tons, bridgework, State Highway & Bridge Authority, Philadelphia and Montgomery counties, Pa., bids July 31; also 1400 tons reinforcing bars.

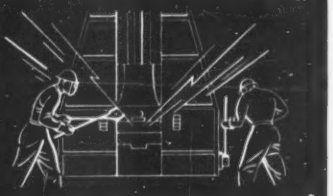
3000 tons, The Dalles power project, Columbia river; bids in to general contractors.

360 tons, two structures, Hanford Works, general contract to Sound Construction & Engineering Co., Seattle, low $473,823.

250 tons, warehouse, Sylvania Electric Prod-

(*Please Turn to Page* 192)

M·S·A EAR DEFENDERS



keep harmful noises *out!*

If your workers "can't hear themselves think," chances are *you'll* hear about it in lowered production and damaged hearing.

Loud industrial noises sap energy, interfere with job concentration, and sometimes result in serious hearing loss. M.S.A. Ear Defenders block out these costly noises, yet allow wearer to hear warning signals, speech, and telephone conversation.

M.S.A. Ear Defender design insures comfortable fit; complete closure of ear canal; easy to insert, remove. Ear Defenders are easily cleaned with soap and water. Convenient carrying case keeps them clean in pocket. Write for details.

MSA

Mine Safety Appliances Co.
Braddock, Thomas & Meade Sts.
Pittsburgh 8, Pa.

HEART OF BALTIMORE LOCATION

LORD BALTIMORE HOTEL

No matter for what reason you come to Baltimore, the chances are we're nearest to where you want to go.

IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

July 9	$43.17
July 2	43.17
June avg.	40.50
July 1952	42.60
July 1948	41.43

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	44.00-45.00
No. 2 bundles	39.00-40.00
No. 1 busheling	44.00-45.00
Machine shop turnings	26.00-27.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	31.00-32.00
Cast iron borings	30.00-31.00
Cut structurals	48.00-49.00
Heavy turnings	40.00-41.00
Punchings & plate scrap	48.00-49.00
Electric furnace bundles	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	42.00-43.00
Heavy breakable cast	40.00-41.00
Unstripped motor block	35.00-36.00
No. 1 machinery cast	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 2-ft. and under	53.00-54.00
Rails, 18-in. and under	54.00-55.00
Rails, random lengths	49.00-50.00
Rails specialties	51.50-52.50

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	24.00-25.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	28.00-29.00
Cast iron borings	28.00-29.00
Low phos.	46.00-47.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	45.00-46.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Charging box cast	44.00-45.00
Stove plate	43.00-44.00
Heavy breakable cast	38.00-39.00
Unstripped motor blocks	27.00-28.00
Brake shoes	38.00-39.00
Clean auto cast	46.00-47.00
No. 1 wheels	40.00-41.00
Burnt cast	35.00-36.00
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R.R. Malleable	49.00-50.00
Rails, 3-ft. and under	52.00-53.00
Rails, 18 in. and under	*55.50-56.50*
Rails, random lengths	*48.50-49.50*
Cast steel	50.00-51.00
Railroad specialties	52.00-53.00
Uncut tires	51.00-52.00
Angles, splice bars	*52.50-53.50*
Rails, rerolling	*55.00-56.00*

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	45.00-46.00
No. 2 bundles	40.00-41.00
Machine shop turnings	26.00-27.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	*48.00-49.00*
Electric furnace bundles	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00
No. 1 bundles	43.00-44.00
No. 2 bundles	34.00
No. 1 busheling	43.00-44.00
Electric furnace bundles	44.00-45.00
Machine shop turnings	28.00
Mixed borings, turnings	32.00
Short shovel turnings	34.00
Structurals & Plate	45.00-46.00
Heavy turnings	*42.00-43.00*
Couplers, springs, wheels	50.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	40.00
Heavy breakable cast	43.00
Unstripped motor blocks	29.00
Drop broken machinery	47.00-48.00

NEW YORK

(Brokers' Buying Prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	30.00-31.00
No. 2 bundles	27.00128.00
Machine shop turnings	20.00
Mixed borings, short turnings	22.00-23.00
Low phos. (structural & plate)	39.00-40.00
Shovel turnings	23.00-24.00

Cast Iron Grades

No. 1 cupola	32.00-34.00
Unstripped motor blocks	22.50-23.00

DETROIT

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	*30.00-31.00*
No. 1 bundles	37.00-38.00
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*34.00-35.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*20.00-21.00*
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	*34.00-35.00*
Stove plate	*34.00-35.00*
Heavy breakable	29.00-30.00
Unstripped motor blocks	30.00
Clean auto cast	42.00-43.00
Malleable	44.00

CINCINNATI

(Delivered consumer plant)

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	44.00
No. 2 bundles	38.00
No. 1 busheling	44.00
Machine shop turnings	*25.00*
Mixed borings, turnings	25.00*
Short shovel turnings	29.00*
Cast iron borings	25.00*

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	*40.00*
Heavy breakable cast	*40.00*
Drop broken machinery	*50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00
Malleable	*45.00*
Rails, 18-in. and under	53.00
Rails, random lengths	45.00

*F.o.b. shipping point.

CHICAGO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 factory bundles	42.00-43.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	35.00-36.00
No. 1 busheling	41.00-42.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Short shovel turnings	24.00-25.00
Cast iron borings	*22.00-23.00*
Cast structurals	*45.00-47.00*
Punchings & plate scrap	*45.00-47.00*
Electric furnace bundles	43.00-44.00

Cast Iron Grades

No. 1 cupola	*40.00-42.00*
Stove plate	*34.00-36.00*
Unstripped motor blocks	35.00-37.00
Clean auto cast	*45.00-47.00*
Drop broken machinery	*45.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. Malleable	*43.00-45.00*
Rails, 2-ft. and under	*52.00-53.00*
Rails, 18-in. and under	*54.00-55.00*
Angles, splice bars	*49.00-51.00*
Rails, rerolling	*53.00-55.00*

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	29.50-30.50
No. 2 bundles	29.00-30.00
Machine shop turnings	20.75-21.75
Short shovel turnings	22.75-23.75
Cast Iron borings	22.75-23.75
Cut structurals	39.00-40.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. Shipping Point)

No. 1 cupola	39.00-40.00
Charging box cast	30.00-31.00
Stove plate	35.00-36.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2-ft. and under	45.00-46.00
Rails, random lengths	42.00-43.00
Angles, splice bars	45.00-46.00
Rails, rerolling	45.00-46.00

ST. LOUIS

(Brokers' Buying Prices)

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*36.00-38.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*34.00-36.00*
Machine shop turnings	*19.00-20.00*
Short shovel turnings	*21.00-22.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	*35.00-36.00*
Heavy breakable cast	*36.00-38.00*
Unstripped motor blocks	*35.00-36.00*
Brake shoes	41.00
Clean auto cast	44.00
Burnt cast	*34.00-35.00*

Railroad Scrap

Malleable	36.00
Rails, 18-in. and under	*53.00-55.00*
Rails, random lengths	*48.00-50.00*
Uncut tires	*46.00*
Angles, splice bars	*46.00-47.00*
Rails, rerolling	*51.00-53.00*

BUFFALO

No. 1 heavy melting	40.50-41.00
No. 2 heavy melting	38.00-38.50
No. 2 Bundles	36.00-36.50
No. 1 bundles	40.50-41.00
No. 2 busheling	40.50-41.00
Machine shop turnings	23.50-24.00
Mixed borings, turnings	28.00-29.50
Short shovel turnings	29.50-30.50
Cast iron borings	29.00-29.50
Low phos.	44.50-45.00

Cast Iron Grades (F.o.b. Shipping Point)

No. 1 cupola	37.00-37.50
No. 1 machinery	42.00-43.00

Railroad Scrap

Rails, random lengths	45.75-46.75
Rails, 2 ft and under	51.75-52.75

BOSTON

(Brokers' Buying Prices; f.o.b. shipping points)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*28.00-28.50*
No. 1 bundles	32.00-34.00
No. 2 bundles	25.00-26.00
Machine shop turnings	17.50-18.00
Mixed borings, turnings	19.00-20.00
Short shovel turnings	21.00-21.50
No. 1 cast	30.00-31.00
Mixed cupola cast	26.00-28.00
No. 1 machinery cast	38.00-39.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	31.00
No. 2 heavy melting	27.00
No. 1 bundles	*29.00*
No. 2 bundles	*23.00*
No. 3 bundles	*19.00*
Machine shop turnings	*13.00*
Mixed borings, turnings	*13.00*
Short shovel turnings	*13.00*
Electric Furnace, No. 1	38.00

Cast Iron Grades (F.o.b. Shipping Point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	30.00-35.00
Unstripped motor blocks	*27.00*
No. 1 wheels	38.00-40.00
Stove plate	*26.00*

Railroad Scrap

Rails, random lengths	*34.00-35.00*

SAN FRANCISCO

No. 1 heavy melting	28.00
No. 2 heavy melting	24.00
No. 1 bundles	25.00
No. 2 bundles	22.00
No. 1 busheling	28.00
Machine shop turnings	10.00
Mixed borings, turnings	29.00
Short shovel turnings	29.00
Cast iron borings	29.00
Cut structurals	38.00
Heavy turnings	34.00
Punchings & plate scrap	37.50
Electric furnace bundles	37.00

Cast Iron Grades

No. 1 cupola	*37.00-39.00*
Charging box cast	47.00
Stove plate	46.00
Heavy breakable cast	45.00
Unstripped motor blocks	41.00
Brake shoes	41.00
Clean auto cast	52.00
No. 1 wheels	47.00
Burnt cast	41.00
Drop broken machinery	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	37.00
Malleable	55.00
Rails, 3-ft. and under	42.00
Rails, 18-in. and under	45.00
Rails, random lengths	39.00
Cast steel	40.00
Uncut tires	39.00
Angles, splice bars	42.00
Rails, rerolling	44.00

LOS ANGELES

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
Machine shop turnings	8.00

Cast Iron Grades (F.o.b. Shipping Point)

No. 1 cupola	38.00-40.00

HAMILTON, ONT.

(Delivered Prices)

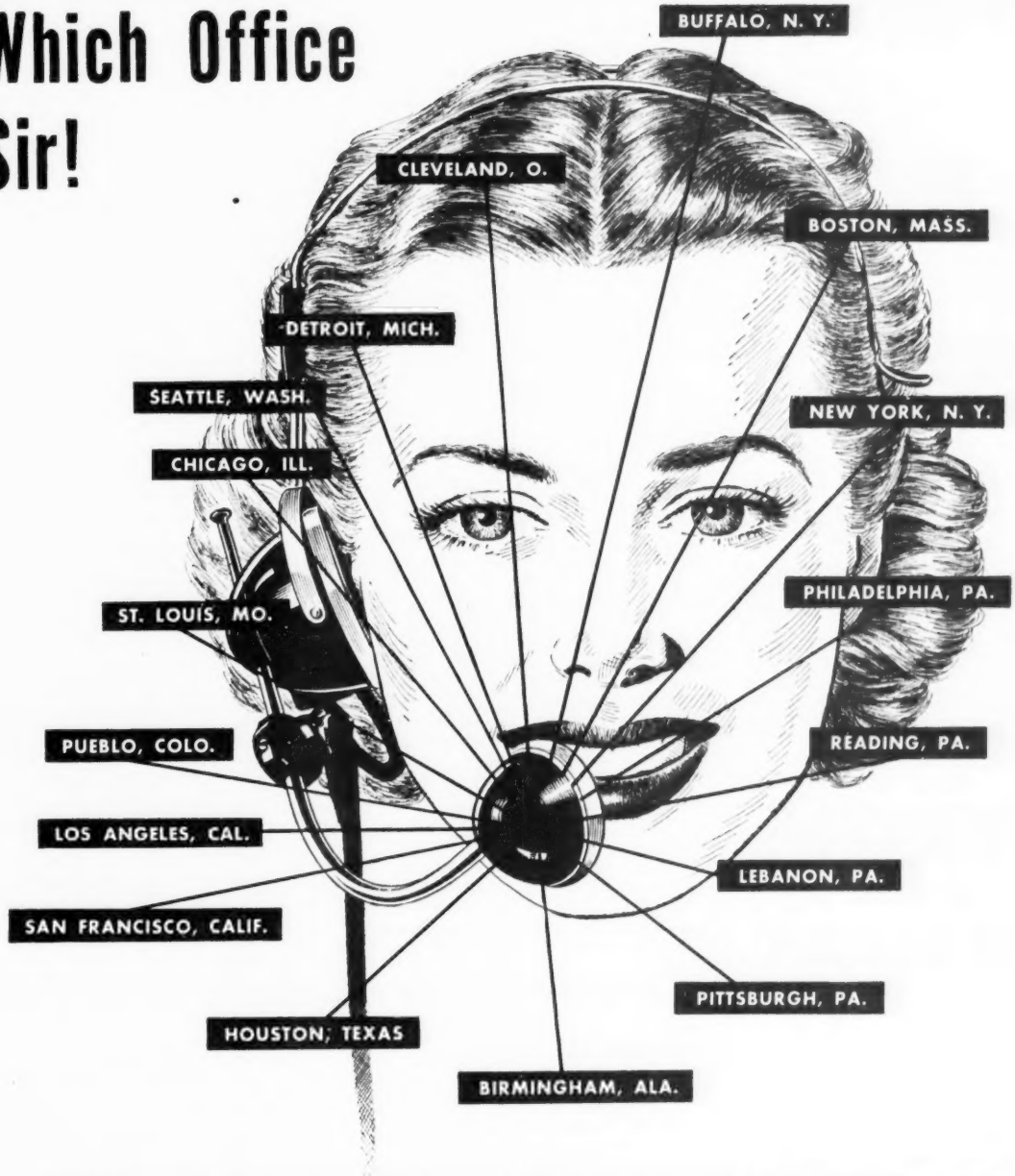
Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.50
Mechanical bundles	28.50
Mixed steel scrap	28.50
Mixed borings, turnings	26.50
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	26.50

Cast Iron Grades

No. 1 machinery cast	50.00

† F.o.b., shipping point.

Which Office Sir!



CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
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READING, PENNA.
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA

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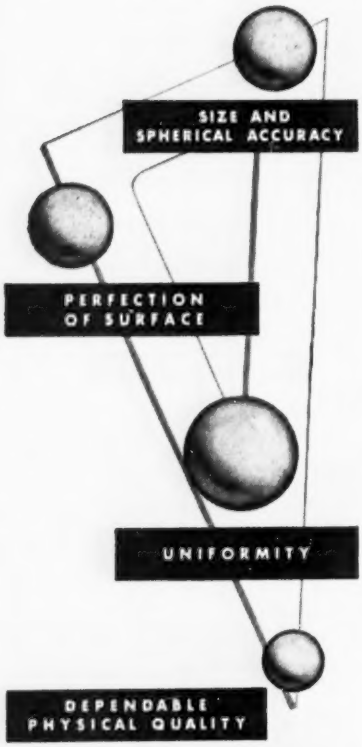
CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

from any angle



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If you have a metal ball problem, why not let Strom solve it for you. Whether for precision ball bearings or for one of many other ball applications . . . Strom will supply the *right* ball to meet your requirements. For more than a quarter century, industry has looked to Strom for metal balls of unsurpassed quality.

Strom STEEL BALL CO.

Largest Independent and Exclusive Metal Ball Manufacturer

1850 So. 54th Ave., Cicero 50, Ill.

(Concluded from Page 189)

ucts Co., Seneca Falls, N. Y., bids July 16.
239 tons, state bridge, Westmoreland county, Pa., bids July 31; also 164 tons of reinforcing steel.
130 tons, warehouse, Pomeroys Inc., Harrisburg, Pa.; Ritter Bros., that city, awarded general contract.
100 tons, grade school, St. Catherine of Siena, Mt. Penn, Pa., near Reading, Pa.

REINFORCING BARS . . .

REINFORCING BARS PLACED

34,000 tons (reported), The Dalles dam, Columbia river, to Oregon Steel Mills, Portland, Oreg.
1560 tons, state bridges and highway, New York thruway, Herkimer county, to Bethlehem Steel Co., Bethlehem, Pa.; L. G. DeFalice & Son, Inc., North Haven, Conn., general contractor.
800 tons, reinforcing and structural, East and West high school buildings, Gretna, La., to Joseph H. Fox & Co., Birmingham, Ala. (bars) and Consolidated Western Steel Corp., Houston, Tex., (structurals); Farnsworth & Chambers Co., Inc., New Orleans, general contractor.
600 tons, state bridges and highway, New York thruway, Rockland county, to United States Steel Supply Division, U. S. Steel Corp., Pittsburgh; L. G. DeFalice & Son, Inc., North Haven, Conn., general contractor.
250 tons, high school, Gonzaga, Wash., to Northwest Steel Rolling Mills, Seattle.
100 tons, maintenance shop, Elelson Field, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Chris. Berg & Co., Seattle, general contractors.

REINFORCING BARS PENDING

1400 tons, bridgework, Philadelphia and Montgomery counties, Pa., for State Highway & Bridge Authority, Harrisburg, Pa., bids July 31; also 3745 tons of structurals.
1000 tons, 11.5-ft. inside diameter siphons, Chandler power canal, Columbia Basin Project; bids to Denver in August.
945 tons, bridges and highway, Ohio Turnpike; bids July 29, Columbus.
900 tons, 4-story addition, Bon Marche department store, Seattle; bids in.
450 tons, addition, Washington state hospital, Steilacoom, Wash.; bids in.
164 tons, bridge, Westmoreland county, Pa., for State Highway & Bridge Authority, Harrisburg, Pa., bids July 31; also 239 tons of structurals.
130 tons, Washington state girder bridge, Yakima county; bids to Olympia, Wash., July 21.
Unstated, addition to heating plant, other structures, Ladd Field, Alaska; Anderson, Montin, Benson low, $1,287,110.

PLATES . . .

PLATES PLACED

10,000 tons, refinery, General Petroleum Co., Ferndale, Wash.; reported placed with two unstated West Coast fabricators.

PLATES PENDING

750 tons, 180,000-barrel capacity underground tanks, Elelson Air Base, Alaska; bids to U. S. Engineer, Seattle, July 14.
250 tons, 500,000-gallon water tank, Fort Campbell, Ky.; bids in, Corps of Engineers, Louisville.

PIPE . . .

CAST IRON PIPE PLACED

145 tons, 12-in. and smaller, Tacoma district improvement, to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

Unstated, 12 to 6-in., system improvement, Kodiak, Alaska; bids to Alaskan Public Works office, Juneau, Alaska, July 22.

RAILS, CARS . . .

RAILROAD CARS PLACED

Chicago, Rock Island & Pacific, 25 covered hopper cars, to the General American Transportation Corp., Chicago.

Advertising Index

Acme Steel Co. 40
Air Products, Inc. 89
Alliance Machine Co., The 128
Allied Chemical & Dye Corporation, General Chemical Division 173
Allison Co., The 177
Aluminum Company of America 8, 9
American Brass Co., The 37, 38
American Gas Furnace Co. 188
American Screw Co. 24, 150
American Wheelabrator & Equipment Corporation 169
Amplex Manufacturing Co. 181
Armco Steel Corporation 52
Atlantic Screw Works, Inc. 24

Barium Steel Corporation 2
Bethlehem Steel Co. 1
Blake & Johnson Co., The 24
Blaw-Knox Co., Lewis Machinery Division 137
Bliss & Laughlin, Inc. 44
Bliss, E. W., Co. 22
Borg-Warner Corporation, Ingersoll Steel Division 31
Browning Crane & Shovel Co., The 41
Browning, Victor R., & Co., Inc. 188
Brush Electronics Co. 35
Bullard Co., The 70
Burt Manufacturing Co., The 118

Cadman, A. W., Mfg. Co. 188
Carpenter Steel Co., The 121
Central Screw Co. 24
Chambersburg Engineering Co. 138
Chicago Electric Co. 193
Cincinnati Shaper Co., The 25
Clark Controller Co., The 113, 114
Cleveland Punch & Shear Works Co., The 30
Cleveland Steel Tool Co., The 188
Cleveland Worm & Gear Co., The Inside Back Cover
Climax Molybdenum Co. 163
Colonial Broach Co. 11
Colorado Fuel & Iron Corporation, The, Wickwire Spencer Steel Division 83
Columbia Steel & Shafting Co., Summerill Tubing Company Division 84
Conco Engineering Works Division of H. D. Conkey & Co. 155
Conkey, H. D., & Co., Conco Engineering Works Division 155
Continental Screw Co. 24
Copperweld Steel Co. 73
C-O-Two Fire Equipment Co. 107
Crocker-Wheeler Division, Elliott Co. 93
Curtis Pneumatic Machinery Division of Curtis Manufacturing Co. 39
Cutler-Hammer, Inc. Back Cover

Delta Power Tool Division, Rockwell Manufacturing Co. 127
Detroit Stamping Co. 188
Diamond Mfg. Co. 186

Eagle Lock Co., The 24
Eastern Machine Screw Corporation, The 186
Easton Car & Construction Co. 180
Eaton Manufacturing Co., Reliance Division 96
Ederer Engineering Co. 45
Eichleay Corporation 103
Elco Tool & Screw Corporation 24
Electric Controller & Mfg. Co., The Inside Front Cover
Electric Equipment Co. 193
Elliott Co., Crocker-Wheeler Division 93
Elwell-Parker Electric Co., The 55

(Continued on p. 194)

RAILROAD EQUIPMENT—*FOR SALE*

USED AS IS RECONDITIONED

STANDARD GAUGE FREIGHT CARS

Box, Steel Sheathed, 40-Ton Capacity
Box, Double Sheathed, 50-Ton Capacity
Box, Single Sheathed, 50-Ton Capacity
Flat, 50-Ton, Steel Underframe, 40'6" Long
Gondolas, Composite, or All Steel 50-Ton and 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Ore Hoppers, All-Steel, 50-Ton, Heavy Duty
Tank, 3,000-Gallon, High Pressure
Tank, 8,000-Gallon, Coiled and Non-Coiled

Hoppers, All-Steel, 70-ton, Triple Hopper Cross Dump

EXTRA LONG FLAT CARS

40 & 50 Ton Capacity, Length 70' and 74'
70-Ton Capacity, Length 60'0", All-Steel, Fishbelly Underframes

STANDARD GAUGE AIR DUMP CARS

Side Dump, 20-Yd., 40-Ton, Lift Door
End Dump, 20 Yd., 50-Ton, Drop Door
Side Dump, 30-YD., 50-TON, DROP DOOR

CABOOSE CARS

Eight Wheel, Cupola Type

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Jordan Spreader
Locomotive Cranes
Overhead Cranes
Railroad Track Scales

STANDARD GAUGE DIESEL-ELECTRIC ROAD SWITCHING LOCOMOTIVE

300 H.P., 70-Ton, Type 0-4-4-0
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STORAGE TANKS
6,000 Gallon
8,000 Gallon
10,000 Gallon

"ANYTHING containing IRON or STEEL"

CLASSIFIED

Help Wanted

MAJOR GRINDING WHEEL MANUFACTURER has opening for an experienced grinding wheel salesman in the Cleveland area. Please state qualifications and experience. Write Box 772, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN—SPECIALTY STEEL
A manufacturer of special steels has several openings for salesmen who have sales experience with specialized steel products. Engineering and metallurgical background desired. Write Box 768, STEEL, Penton Building, Cleveland 13, Ohio.

Representatives Wanted

WANTED—MANUFACTURERS REPRESENTATIVE or sales firm to represent steel fabricator specializing in steel plate and alloy fabrication. Please give full particulars. Write Box 769, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

ENGINEERING GRADUATE, SALES EXPERIENCE, AGE 33, MARRIED, RESIDING IN INDIANAPOLIS, DESIRES CONNECTION AS INDUSTRIAL SALES REPRESENTATIVE. WILL TRAVEL INDIANA AND NEIGHBORING STATES. REPLY BOX 773, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

PLANT MANAGER with 25 years' experience in Costs, Production and Management functions. M.I.T. graduate. Write Box 758, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, $12.50, each additional word .25; all capitals, minimum 50 words $16.00, each additional word .32; all capitals leaded, minimum 50 words $19.50, each additional word .39. "Positions Wanted" set solid, minimum 25 words $3.00, each additional word .12; all capitals, minimum 25 words $3.75, each additional word .15; all capitals, leaded, minimum 25 words $4.50, each additional word .18. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Classified rates with the exception of "Positions Wanted" are subject to 15 per cent agency commission and 2 per cent cash discount ten days. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.

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WANTED

Bar or Tube Draw Bench, 20,000 to 30,000 lb. capacity. Give full particulars in reply.

Box 763, STEEL,
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• Engineering degree or equivalent. Age 30 to 40. Experienced in manufacturing and tool design in medium to heavy industry, both in production and special applications. Must be forceful and aggressive, but diplomatic, with ability to work with others. For permanent position with future, examining manufacturing methods and making recommendations for improving production and lowering costs through design modifications, material purchasing and shop time reduction. Old established, nationally known Buffalo manufacturer with steady, year around volume. Write fully, including detailed experience, age, educational qualifications and salary expected. Letters will be kept strictly confidential. Box 770, STEEL, Penton Bldg., Cleveland 13, Ohio.

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are of equal interest to distributors and manufacturers—use an ad on this page next week to let manufacturers know you are interested in taking on new lines.

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(4) four tray six wheel heavy duty trucks. Complete with flame safety controls and thermostat. Max. rated temp. 500°F. Motors 220/3/60. Controls 110/1/60. Two years old. Excellent condition. Original cost $4,390. Make offer.

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Penton Bldg., Cleveland 13, Ohio

IF YOU HAVE CAPACITY OPEN,

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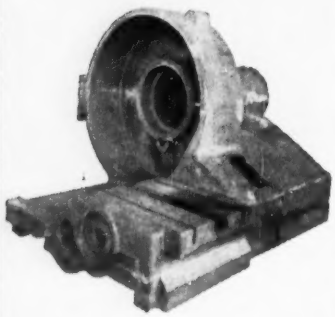

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ROLLS
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GREY IRON CASTINGS

Advertising Index

(Continued from p. 192)

Fansteel Metallurgical Corporation, Weiger-Weed & Co. Division 182
Farrell-Cheek Steel Co. 29
Fawick Airflex Division, Federal Fawick Corporation 81
Federal Fawick Corporation, Fawick Airflex Division 81
Follansbee Steel Corporation 130
Fort Pitt Bridge Works 148
Foster, L. B., Co. 193

Galland-Henning Mfg. Co. 183
Gallmeyer & Livingston Co. 174
General Chemical Division, Allied Chemical & Dye Corporation 173
General Electric Co. 33, 157
Gerrard Steel Strapping Division, United States Steel Corporation 175
Gisholt Machine Co. 17, 18, 19, 20
Goodyear Tire & Rubber Co., Inc., The 4
Gorham Tool Co. 12
Great Lakes Screw Corporation 24
Grip Nut Co. 145

Harbison-Walker Refractories Co. 146
Harper, H. M., Co., The 24, 34
Hartford Special Machinery Co., The 144
Heyl & Patterson, Inc. 15
Houghton, E. F., & Co. 126
Hyde Park Foundry & Machine Co. 194

Ingersoll Steel Division, Borg-Warner Corporation 31
Iron & Steel Products, Inc. 193

Jeffrey Manufacturing Co., The 36
Johnson Bronze Co. 116
Jones & Laughlin Steel Corporation 90

Kennametal, Inc. 143
Kidde, Walter, & Co., Inc. 10

Lamson & Sessions Co., The 24
Landis Machine Co. 14
LeBlond, R. K., Machine Tool Co., The 26, 27
Leeds & Northrup Co. 28
Lewis Machinery Division, Blaw-Knox Co. 137
Lindberg Engineering Co. 105
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 32
Lord Baltimore Hotel 189
Luria Brothers & Co., Inc. 191

McKay Machine Co., The 65
McKee, Arthur G., & Co. 111

Macwhyte Co. 3
Mathews Conveyer Co. 187
Mead Specialties Co. 117
Mine Safety Appliances Co. 189
Murray, A. B., Co., Inc. 178

National Forge & Ordnance Co. 154
National Lock Co. 24
National Roll & Foundry Co., The 158
National Screw & Manufacturing Co., The 24
National-Standard Co. 23
National Steel Corporation 125

Oakite Products, Inc. 109
Ohio Locomotive Crane Co., The 186

Parker-Kalon Corporation 24
Pawtucket Manufacturing Co. 6
Penn Iron Works, Inc. 186
Pheoll Manufacturing Co. 24, 77
Pittsburgh Coke & Chemical Co., Protective Coatings Division 153
Pittsburgh Plate Glass Co., Brush Division 186
Pollock, William B., Co., The 108
Precision Extrusions 5
Production Steel Co. 66

Ready-Power Co., The 152
Reliance Division, Eaton Manufacturing Co. 96
Republic Steel Corporation 95
Rockford Screw Products Co. 24
Roebling's, John A., Sons Corporation 13
Roura Iron Works 151
Ryerson, Joseph T., & Son, Inc. 56

Salem-Brosius, Inc. 47
Sargeant & Wilbur, Inc. 16
Scovill Manufacturing Co. 24
Screw Research Association 24
Shakeproof Div. of Illinois Tool Works 24
Southington Hdwe. Mfg. Co., The 24
Sperry Products, Inc. 133
Standard Pressed Steel Co. 46
Starrett, L. S., Co., The 7
Steel City Testing Machines, Inc. 106
Sterling Bolt Co. 24
Strom Steel Ball Co. 192
Stronghold Screw Products, Inc. 24
Struthers Wells Corporation 135
Summerill Tubing Company Div., Columbia Steel & Shafting Co. 84

Texas Co., The 48
Thompson Products, Inc., Jet Division 119
Timken Roller Bearing Co., The, Steel & Tube Division 74
Tinnerman Products, Inc. 78
Toledo Stamping & Manufacturing Co. 188
Tomkins-Johnson Co., The 140
Torrington Co., The, Swager Department 178
Turner Bros., Inc. 42, 43

Union Carbide & Carbon Corporation, Linde Air Products Co. 32
United Engineering & Foundry Co. 149
United Manufacturing Co., The 156
United States Steel Corp., Subsidiaries 175
U. S.-Burke Machine Tool Division, The 184
U. S. Stoneware Co., The 120

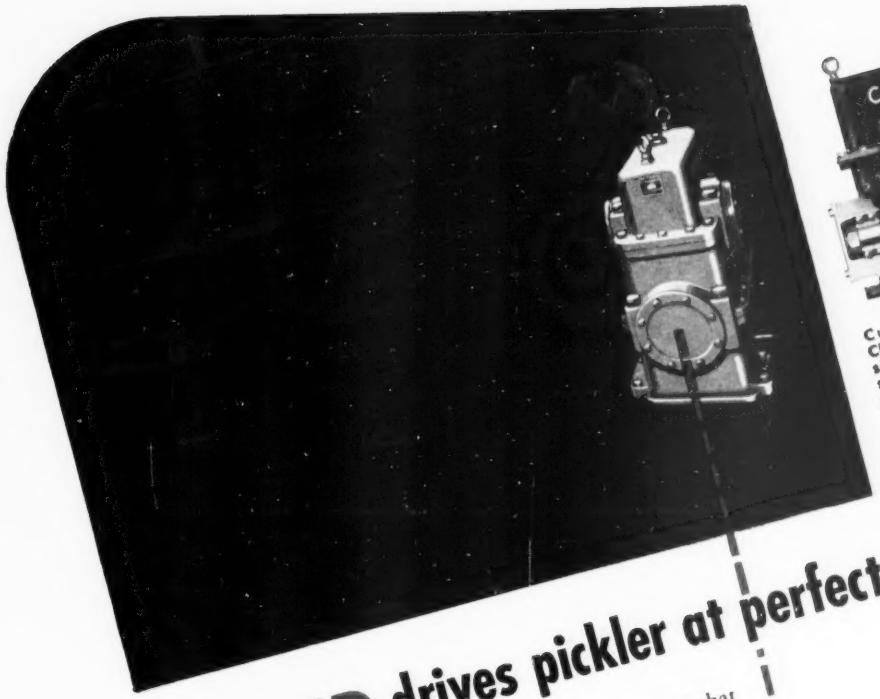
Vaughn Machinery Co., The 141

Wales-Beech Corp. 24
Weiger-Weed & Co. Division of Fansteel Metallurgical Corporation 182
Weirton Steel Co. 125
Wesche, B. A., Electric Co., The 184
Westinghouse Electric Corporation, Sturtevant Division 51
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 83
Wisconsin Steel Co. 176
Wittek Manufacturing Co. 180

Youngstown Sheet & Tube Co., The 21

Table of Contents, Page 5

Classified Advertising, Page 193



Cutaway above—standard Cleveland Double Reduction Unit, showing high speed and low speed gear assemblies. Cleveland double reduction units available in special designs engineered to serve other slow speed needs. Left—courtesy Precision Drawn Steel Co., Camden, N. J.

CLEVELAND drives pickler at perfect pickling pace

SATISFACTORY pickling of steel requires a drive that immerses and raises bars at a prescribed slow rate. Uniformity of movement keeps the solution circulating evenly and insures efficient descaling.

Steel treated in the mechanical bar pickler shown above is neither underpickled nor overpickled. Installed in a New Jersey plant, it is driven by a dependable Cleveland double worm gear speed reducer. This Cleveland standard unit, incorporating both high speed and low speed gearing, provides a high reduction ratio in very limited space.

Case hardened steel worms running on nickel-bronze gears wear negligibly and run quietly. They contribute to Cleveland's national reputation for long-wearing, inherently quiet drives—drives that transmit power with even, uninterrupted torque flow.

Write today for new Catalog 400 with sizes, dimensions and horsepower ratings of the entire Cleveland line of worm gear drives. The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

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☆ *Installs easier*

The cost of installing motor control today is usually much more than the cost of the control equipment, often two to three times as much. Thus this new control offers *large* savings.

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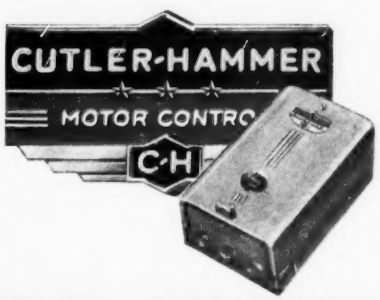
Revises all existing ideas of long trouble-free life in motor control. Cuts rate of wear to point that maintenance care and cost are virtually eliminated for 90% of all control uses.

Look for the three silver stars on the famous Cutler-Hammer nameplate; they identify the new spectacular Cutler-Hammer ☆☆☆ Motor Control. These three stars stand for three entirely new standards in motor control satisfaction and value. ☆ 1 . . . Easier, faster, lower cost installation any electrician can readily prove. ☆ 2 . . . Time-saving, trouble-saving, cost-cutting better performance which any test will confirm. ☆ 3 . . . Amazingly longer life due to advanced engineering features anyone can understand. Compare it by features and by performance. You too will say it is the finest control you know. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin.

TRY IT !
COMPARE IT !
TEST IT !
PROVE IT !

Order from your nearby Authorized Cutler-Hammer Distributor today.



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